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General Article

A DIAGNOSIS OF TUBERCULOSIS UNDER THE TUBERCULOSIS ORDER, HAVING REFERENCE TO THE FORMS OF TUBERCULOSIS DEALT WITH UNDER THE ORDER*

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It is with great timidity that I rise to read this paper, as unfortunately I cannot exclaim "*Haud non expertus Loquor.*" This paper is no more than an attempt to put in writing the impressions conveyed to the mind by little over a year's close contact with tuberculosis under the Bovine Tuberculosis Order.

During this period over 500 animals have been slaughtered, and no doubt as many more were examined and declared not to be suffering from the disease. Most of the statements are based on the findings in these cases, and no use whatsoever has been made of the text-book.

You will all agree that tuberculosis is the most protean of all diseases, and at first sight it often seems impossible to assign to one group clinical conditions presenting such essentially different appearances. Tuberculosis under the Order makes the issue still more difficult, as it really means: open tuberculosis and tuberculous emaciation. It would simplify matters very much if, for example, we could slaughter every animal showing tuberculous glands, but this is not the case, as we have to go further and pronounce the animal to be suffering from tuberculous mastitis, tuberculous emaciation, or a chronic cough, with definite clinical signs of tuberculosis—not always an easy task.

The different forms will now be taken as they appear on Form T.5 under the Order:—

A—TUBERCULOSIS OF THE UDDER

This condition was met with in 28 cases, or 5·6 per cent. of the 500 cases. It can be said at once that this is impossible to diagnose definitely by clinical examination only. No doubt one can form a very shrewd opinion about a diseased udder, and in fact over half the cases met with were slaughtered without reference to either microscopical examination or the biological test. Some pointers towards the existence of tuberculosis in this region are as follows. First, the presence of a well-defined, hard, non-painful swelling, usually starting at the base of one teat (more commonly the hind teat), as a small nodule, and increasing gradually in size, until perhaps one or more quarters may be involved. If one could form an opinion from such a small number of cases, the right hind quarter is the more commonly affected. The figures are: total, 28; right hind, 13; left hind, 7: front teats, 4; two or more teats, 4. Tuberculous mastitis sometimes is also noted, not commencing in nodular form, but coming on, as a hard, diffuse induration, chiefly in cows shortly after calving. It is accompanied by a little pain, caused chiefly by friction between the hind legs and the very much enlarged gland, the animal's gait being interfered with. In these cases, very often, nothing amiss was noted until the cow had calved, when the disease flared up and spread rapidly. As a rule, it is easy to find the bacilli in the milk in such cases. Occasionally the disease first appears as an elongated swelling, commencing between the two hind quarters and gradually increasing in size.

Much importance is not attached to examination of the supramammary lymphatics for enlargement in attempting to diagnose udder disease, as they are as often normal as otherwise when disease is present. Furthermore, they can sometimes be enlarged in chronic mastitis or in actinomycosis of the udder. If, however, they are found very swollen, hard and perhaps nodular, it is likely that the accompanying chronic mastitis is of a tuberculous variety.

The character of the secretion, when present, is always helpful. With tuberculosis, as a rule, it is very slightly, if at all, changed at first, either in appearance or in quantity, but after a variable period it becomes watery, greenish in colour and reduced in quantity, often containing pinkish yellow floccules. Sometimes a case is met with where no secretion can be got from the gland; then the diagnosis has to be made on clinical appearances alone, or with the aid of the tuberculin test.

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Chronic mastitis due to other organisms, such as staphylococci, streptococci, or the Preisz-Nocard bacillus, may be quite easily mistaken for the tuberculous form, but these usually have the history of being preceded by the acute form, with its accompanying great pain. The swelling is more diffuse, whereas in tuberculosis one can feel what appears like a stone in the udder; in these forms the borders of the induration are difficult to make out. The secretion, when present, is thick and purulent.

A case of mastitis due to actinomycosis has not been met with in practice, but it could probably only be diagnosed by microscopical examination of the milk.

Whenever one is in doubt, a milk sample should be collected into a sterile bottle, with due precautions against outside contamination. There is no reason why every practitioner should not examine milk microscopically. The most difficult part of this procedure is the centrifuging. This, however, can be done in any creamery. Having centrifuged a portion of the sample, the cream and milk are discarded and a film or two made from the deposit. Strictly speaking, the cream should be examined also, as it may contain bacilli. The smears are stained with steaming concentrated carbol-fuchsin, decolourised with 25 per cent. sulphuric acid, and counter-stained with methylene blue. If short, red, brilliant rods are present, diagnosis can be taken as positive. If the bacilli cannot be found the remainder of the milk sample should be sent to the laboratory for biological test, which has the inconvenience of necessitating a delay of up to eight weeks in the diagnosis. If, in any case where the udder is suspicious, the animal has a cough, and the lungs are even doubtful on auscultation, or where there is an enlarged gland elsewhere in the body, there is no need to hesitate in pronouncing the case one of tuberculosis. In 24 cases out of the 28 met with, the lungs were affected as well as the udder. Even *post-mortem* diagnosis of tuberculous mastitis is not always easy. In the early stages the only change noted is that the lobulation is distinct, which is due to an increase of fibrous tissue round the minute tubercles. Later the smaller caseous areas are made out, and after a longer period definite caseo-purulent lesions, having the characteristic yellow colour of bovine lesions elsewhere. Finding a lesion in a supramammary gland makes diagnosis positive on *post-mortem* examination, or finding tuberculosis elsewhere in the carcase is very suggestive. It is preferable to err on the side of slaughtering a non-tuberculous case of mastitis than *vice versa*, due to the grave danger to public health from the milk.

B—Giving Tuberculous Milk

One occasionally receives a report that tubercle bacilli have been found in a sample of bulked milk at a creamery, with a request that the herd from which the milk came be inspected and the offending cow or cows destroyed. This is at times a difficult task, as no cow in the herd may be showing evidence of chronic mastitis. In such a case it is well to question the owner as to recent sales of milking cows and as to the absence from the present herd of any cow which was milking at the time the sample was taken. This might throw light on a very difficult problem. Every cow in the herd should receive a searching clinical examination, not only for evidence of mastitis, but also for tuberculous lesions elsewhere.

Milk samples should be taken from one or more quarters of every cow showing the least suspicion of mastitis, and these suitably labelled for identification. Where no suspicious animal can be detected it is well to divide the herd, if large, into groups and take group samples. Thus the offending animal can be traced to one group, and testing samples from the individual members of this group will solve the problem.

I remember assisting my father on an errand of this kind on one occasion, when even testing the samples from the individual cows failed to pick out the animal contaminating the milk. Clinical examination of a searching nature detected crepitations in the lungs of one cow. She was in poorer condition than the other nine, and gave an occasional cough. She was destroyed and found to be suffering from tuberculosis of the lungs, pleura and bronchial glands. It is doubtful whether the original contamination was due to her milk intermittently containing the bacilli, or whether the latter got into the bulked milk from outside contamination. This occurred seven years ago, and the farmer has never had a case of tuberculosis since.

When on a mission of this nature it is best to visit the herd at milking time, as the routine of the cattle will be least disturbed, the strippings can be obtained (which are most likely to contain the bacilli), and the milkers, who are a possible source of contamination, can be observed. Also, it is much more satisfactory to examine an empty cow's udder than one distended with milk.

C—Tuberculous Emaciation

Emaciation is a pathological condition quite distinct from excessive leanness, in which the fat is replaced by a serous material; this is accompanied by wasting of the muscles, a dull coat and a hide-bound skin. The fact that an animal is emaciated does not mean that she is tuberculous, and therefore does not bring her under the Order. Neither is tuberculous emaciation a special form of the disease, but is merely the result of the ravages of tuber-

culosis existing somewhere in the animal's body. Therefore, when making a diagnosis, emaciation does no more than help us, by indicating that the animal is suffering from a wasting disease. But the question of tuberculosis has to be decided on its merits, from evidence of lesions in some definite organ in the body, due to the specific disease. It must be remembered that emaciation is also produced by other diseases such as parasitic gastritis in young animals, fluke in animals of all ages, alimentary or renal affections. Speaking of fluke recalls a peculiar case met with two years ago where tuberculosis was suspected. All the members of two adjacent herds, over three years old, began to lose condition to such an extent that they were emaciated. When examined, beyond emaciation, no abnormal symptom could be found. Appetite and thirst were normal, respirations were normal and all excretions quite natural, but the animals became daily more dejected. No calf or animal under three years was affected. This apparently had happened for some years, with the result that all the older members of the herd had died off. Microscopical examination of the fæces (no scour was present) revealed fluke eggs, and treatment for fluke was successful, but had to be repeated again last year. The pasture was high upland country where one would suspect fluke last of all.

D—Suffering from Chronic Cough, and Showing Definite Clinical Signs of Tuberculosis

This is referred to under the Order as Tuberculosis Form (iii). Its diagnosis, as a rule, means deciding whether the animal is suffering from pulmonary tuberculosis or a tuberculous pleuropneumonia. Under this heading there is plenty of room for mistakes, and I fear we frequently avail ourselves of our opportunities in this direction, not alone *ante*- but also *post-mortem*. The history of the animal is first looked into. Has she been showing symptoms long? How long is she calved? Has she a cough and what is its nature? Very many cases are first noted after calving, the disease evidently becoming progressive after pregnancy and parturition. The history of the owner, with regard to the other two points, must be accepted with discretion, especially now, when even the minimum value (30s.) is often six times more than the market value of an aged animal. Also, the average intelligent farmer is sufficiently acquainted with the disease, and the Tuberculosis Order, to know that the veterinary inspector may be influenced by the history of a tedious disease and a short dry cough. Is a short dry cough actually a constant symptom? I believe it is not, and am much more influenced by hearing an animal give three or four soft, loose, fairly long coughs, or, as is said by the owner, "She has a dirty cough." The length of time an animal is affected with such a cough is of importance, as sometimes an observant owner or a cute one will report an animal when she has had a cough for a week or two weeks, and these are often cases of pleurisy. The fact that an animal has never been heard to cough should not mislead one either. It was only last week that a cow was slaughtered that was never heard to cough, nor could she be got to cough by exercise or drinking cold water. On *post-mortem* examination she was found to be badly affected. This was only one of many such cases. It is always advisable to hear the cough for oneself, if it exists, and better to get the animal to cough spontaneously than to use such methods as pressure on the larynx or other mechanical means. Coughing is usually brought on by a change of temperature, such as leading a cow out of a warm byre on a cold winter's day, by driving a cow (preferably uphill) or by allowing her a drink of cold water. The ejection of a muco-purulent discharge when coughing, or of a clear discharge with little floccules in it, should be looked on as a positive symptom; or sometimes a swallowing movement after coughing, which indicates the swallowing of sputum. The nature of the cough varies greatly. One frequently meets with a very weak, toneless, short, single cough, which is repeated at intervals, in miliary tuberculosis; a loose, fairly long, moist cough when there are large lesions present in the lungs, and a dry, short cough, which comes on in fits, when the lesions are small, well defined and isolated from each other. A cough is commonly noted in an animal whose lungs are healthy, but where the bronchial and mediastinal glands are much enlarged, causing pressure on the lungs. We must never forget that coughs of different kinds can also be brought on by other conditions such as chronic pneumonia, pleurisy, emphysema, fluke cysts, and possibly liver disorders.

From observations on 500 cases it is my conclusion that tuberculosis in bovines commences at that portion of the main lobe between the diaphragm, the ribs and the vertebræ, *i.e.*, the postero-superior aspect of the lungs, from the diagnostician's point of view. When examining a lung *post-mortem* this is the first part palpated, and if tuberculosis is not found here faith in the diagnosis becomes rather shaky. It is an every-day occurrence to meet with small or even large lesions here, and no evidence of tuberculosis elsewhere in the lung. On two occasions, however, isolated lesions were met with in that portion of the lungs surrounding the entrance of the bronchi. On no occasion has the disease been met with in the apical lobe, without a lesion somewhere else in the lung.

The cardiac lobe would appear to be a pre-

deliction site for chronic pneumonia, judging by the number of cases in which this portion of the lung was chiefly affected.

Taking these findings into consideration, when examining a lung by auscultation or percussion it is always best to commence at the postero-superior aspect of the chest and first go gradually forward. Then commence again at the starting place and go downwards and forward. Thus one gets the best opportunity of noting a difference between affected and non-affected parts when the lesions are not distributed uniformly throughout the lungs. It is rarely possible to make out a small lesion at the root of the bronchi by either auscultation or percussion, as the situation is too deep-seated.

More importance is attached to the findings on auscultation than any other of the clinical signs, because when there is found an abnormal respiratory noise, it is certain there is an abnormality in the chest to correspond with it. To describe these changes from the normal which are found on auscultating a bovine's thorax is next to impossible. Normally, bovine respirations are at the rate of 12-15 per minute; they are partly thoracic and partly abdominal. They are normally increased with exercise up to four times. The sounds heard normally on auscultation are, first, the bronchial sound—a blowing sound, heard best over the mid-chest (during expiration), where the bronchi are largest. Its origin is a point of controversy: some believe it is produced in the bronchi, while others maintain it is made in the larynx. The second sound, known as the vesicular murmur, is like the gentle rustling of dry leaves, and is produced by the expansion of the lung tissue during inspiration. When there is any lesion of average size in the lungs these sounds are altered. The abnormal sounds, if in the lung tissue, will be absolutely synchronous with either the bronchial sound or the vesicular murmur. On one occasion on auscultation recently there was heard a hollow, deep ,echo (which could be heard equally well on both sides), immediately following the bronchial sound, and it was thought that the lung was affected. On *post-mortem* examination it was learned that this sound was due to great enlargement of the mediastinal glands, due to carcinoma. The lungs were normal. This animal had a short cough coming on in fits. Later a similar sound was met with, but it was accompanied by abnormal sounds, synchronous with the respiratory sounds. *Post-mortem* examination revealed tuberculosis of the lungs, as well as of the mediastinal glands, which were greatly enlarged. A third case was met with similar to the first—the animal was treated with potassium iodide. When examined a month afterwards, the echo could faintly be made out but the cough had gone. A lesion in the larynx or retro-pharyngeal gland will cause a distinct abnormal sound to be heard in the thorax, which can be easily differentiated from lung sounds, because it seems to persist during the intervals in normal respiration and is superimposed on the respiratory noises. This snore is heard equally well on both sides, being most distinct over the mid-chest.

In the early stage of tuberculosis, the vesicular murmur becomes roughened, rasping and jerky. The bronchial sound is longer than the inspiratory sound and is harsh in character. These selfsame changes in respiration are noted in emphysema of the lung and this latter is not a very impressing abnormality to find when one is making a *post-mortem* examination.

As the tuberculous lesions become larger, the aforementioned respiratory noises become more marked and expiration is more blowing in character. Crepitation can now be made out over the developing tubercles, and sometimes little snoring noises can be discerned in the lung. The vesicular murmur becomes exaggerated in the healthy part of the lungs and no sound may be heard over the diseased area. At a later stage these silent areas become larger, and as the lesions undergo softening, gurgling and scuffling sounds can be made out. When cavities occur in the lung, loud rattling sounds can be distinctly heard.

No apology is made for such a poor attempt at describing the abnormal noises heard on auscultation—they certainly give a good deal of information to the diagnostician, but really it is almost impossible to describe how they do it. Since childhood I have been trained to auscultate bovine lungs and have now come to the conclusion that no teaching will improve one; it is just a matter of learning the sound of healthy lungs by experience and then being able to detect the deviations from normal in the diseased lung. No two auscultations convey the same impression, as rarely are two lungs met with which have the identical lesions.

When one makes out a dull area at the postero-superior aspect of the lung, râles below and in front of this, and beyond this latter area an increased vesicular murmur, it is no harm to make a shrewd guess as to the existence of tuberculosis.

Another fairly good indication is to hear irregular, loud, crepitating areas throughout the lung, separated by areas where the vesicular murmur is intensified. The fact that respirations are hurried in these cases is another help in coming to a conclusion.

It is a good plan to exercise an animal before auscultation when there is any difficulty in hearing properly, as this will have the effect of increasing both the normal and abnormal respiratory noises, but one should avoid being

misled by the seeming rough sounds and the hurried respirations in an animal after severe exertion.

Miliary tuberculosis was noted in 0·63 per cent. of cases. It is characterised by hurried respirations, often almost gasping in character, general roughening of all the respiratory sounds with no areas of normal vesicular murmur in the lungs. Usually, this form of the disease is noted in cows within three weeks after calving. It is liable to be mistaken for acute pneumonia, especially as it is accompanied by a rise of temperature, and really it is nothing less than a very acute form of pneumonia due to the tubercle bacillus.

It is sometimes possible to make out a tuberculous pleurisy by auscultation. Here the abnormal sounds are best heard at the lower portion of the chest. They sound as if something were being rolled between the lung and costal pleura and are very near the ear of the listener. They are too distinct for the sounds produced in moist pleurisy and are not so regular as those of the chronic form, not, as a rule, being the same at each respiratory effort. In chronic pleurisy the sound is a grating one heard with each respiration, while in tuberculosis the abnormality could be better described as a whine. By auscultation alone I cannot see how chronic pneumonia can be distinguished from the tuberculous form. Sometimes the areas of crepitation are more uniform and compact, the abnormal sounds are softer and all the râles are within a certain area, while in tuberculosis, as a rule, one meets crepitations separated by healthy areas. One should be suspicious of chronic pneumonia in marshy, low-lying areas where it is most prevalent. This condition is fairly well confined to certain districts.

Fluke cysts in the lungs prove themselves another "bunker" for the unwary diagnostician and here also one learns by experience the farms on which to suspect trouble of this nature. On one day I remember my father, aided by me, killing two animals affected with fluke cysts, and having no trace of tuberculosis: they were on farms 30 miles separated from one another. When present in the lung these cysts are usually situated near the costal surface and, on auscultation, the sound can be made out as coming from a lesion near the ear of the auscultator. They are, as a rule, widely separated from one another and may be confined to one lung. The sound emitted by them is often in the nature of a metallic knock or high-pitched whine. Very often when fluke cysts are present the animal either has diarrhœa or has had diarrhœa in the past. Everyone dealing with a large number of cases under the Order is bound to have up to 1 per cent. mistaken diagnoses due to fluke cysts. It must be borne in mind that fluke can be met with in high land just as well as on low.

Very little importance is attached to percussion as a means of diagnosis, and it is now but rarely practised. It can only be of service in a lean subject, where the lesions are large and near the surface of the lung. It is sometimes of service when trying to ascertain if an area is a consolidated one or just a portion of healthy lung surrounded by a zone of diseased portion where crepitations cannot be made out.

The thermometer assists us in so far as it differentiates between an acute and chronic disease, but here, as already stated, miliary tuberculosis is an exception, the temperature often running up to 106°. As a rule, with the other forms of tuberculosis there is no rise of temperature, or at most a rise of a degree.

Pointers to Tuberculosis

What really helps one to diagnose pulmonary tuberculosis, having found evidence of abnormality in the lung and accompanied by a cough, is the finding of tuberculosis in other situations where its identity can rarely be mistaken. Chief among these situations are the lymphatic glands, disease of a gland being, as a rule, evidence of disease existing in the organ whose lymph stream enters the gland. When the prescapular gland is enlarged due to tuberculosis, the lungs are diseased in almost every case. The rule is that with enlargement of the submaxillary or subparotid glands or both, if these are affected for a period of time—say, over six months—pulmonary disease exists in the majority of cases. For that reason, even the most complete excision of these glands cannot be claimed as a perfect success because one never knows whether or not the lungs have become affected by the time of the operation; in fact, in some cases it would appear as if the disease flares up in the system and becomes rapidly progressive after the operation. Their mere enlargement would be looked upon by some as evidence of progression of the disease and I would agree with them. It would seem that enlargement of the tonsils or of the retropharyngeal glands must be looked upon from an entirely different angle, because when these situations alone are affected and the other glands of the head are normal it is very common to find the lungs quite free from disease. How many heads are condemned at the abattoir due to disease here without any other lesions in the carcase. Furthermore, treatment here is indicated and has the desired effect. The snore very often obscures lung sounds on examination, and sometimes an error in diagnosis occurs for that reason. In these cases the tonsils and retropharyngeal glands should always be examined manually to discern whether the snore is due to tuberculosis or to actinomycosis as, in

North Kerry, at any rate, about 20 per cent. of the snorers are suffering from this latter affection. Be it a coincidence or otherwise, neither my father nor I ever met an animal affected simultaneously with the two diseases.

Enlargement of the popliteal and precrural lymphatics is often accompanied by lung disease and in this connection the enlargement and pulmonary disease are sometimes unilateral. However, we know from our experience in meat inspection that these glands may be affected without any evidence of tuberculosis further forward in the carcase.

Even enlargement of glands accompanied by chronic cough and wasting cannot be taken as an infallible guide to tuberculosis, as the following case will show. A cow was examined some time ago which had a chronic cough, wasted almost to emaciation, definite enlargement of the submaxillary and subparotid on the left side, while the prescapular of the same side was as large as a football. Distinct crepitations could be made out in both lungs. Needless to mention, the diagnosis was rather positive, but *post-mortem* examination revealed the whole trouble as being due to carcinoma.

Just as this was being written an interesting case presented itself. An urgent message was received to visit a cow that was described as having suddenly developed a large swelling between her fore-legs. She was a four-year-old red Shorthorn cow, in fat condition, temperature 102·5°, pulse weak and accelerated, respirations 20; she was feeding normally. The submaxillary space was very slightly puffed, while the dewlap was greatly swollen and typical of pericarditis.

Auscultation of the chest revealed short crepitations at the postero-superior aspect of the left lung, with roughness in the corresponding portion of the right lung. The heart beat was heard, but with difficulty, splashing sounds being made out. The diagnosis of tuberculous pneumonia and pericarditis was received with amazement by the owner and he was slow to allow his grand cow to be destroyed. *Post-mortem* examination revealed tuberculosis of the lungs, pleura, pericardium and bronchial glands. The pericardium contained about half-a-gallon of fluid. The most common form of pericarditis is the tuberculous variety and this should be remembered when an animal has a cough as well as evidence of pericarditis, especially when fever is absent.

Because of its apparent rarity, it is as well to mention another swelling which was met with just behind the dewlap and gave help in the diagnosis of tuberculosis. The owner wished a three-year-old Black Kerry milch cow to be examined as she suffered from a lump in the muscles overlying the lower portion of the sternum and partly between the fore-legs. It had been noticed about three weeks previous, was hard and somewhat painful. The animal was in good condition and milking well. Diagnosis was: a cold abscess probably the result of trauma and infection. The swelling was blistered and no more was heard of the case for six months, when the cow was reported to be very run down and suffering from a chronic cough. The swelling was just the same as when first seen. Crepitations could be made out in isolated regions along the lower portion of the thorax.

The diagnosis was now tuberculosis and the laboratory report on specimens taken from the carcase stated that tuberculosis existed in the muscle and lungs. In this case the pulmonary lesions were confined entirely to the lower portions of the lungs and would appear to be secondary to the myositis. Since that time a lesion has been met with in the connective tissue adjacent to the xiphoid cartilage, in an animal affected with pulmonary lesions. At present there is under observation what is thought to be another case of tuberculous myositis, but the development of lesions to bring the animal under the Order is being awaited. Peculiarly enough, these three last cases were in Kerry cows.

The value of rectal exploration as an aid to diagnosis of tuberculosis under the Order must not be over-estimated: many examinations have been carried out and very little information gleaned. Certainly, some sublumbar and iliac glands were found enlarged, but this did not help very much. In no case could grapes be made out with any degree of certainty and therefore it is taken that tuberculous peritonitis cannot accurately be diagnosed.

A fœtid diarrhœa in an animal apparently affected elsewhere would lead one to suspect a tuberculous liver, but *ante-mortem* it is impossible to diagnose liver disorders in bovines.

The animal's age must be taken into account when in doubt. In yearlings clinical tuberculosis exists in no more than 2 per cent. and one should bear in mind the possibility of bronchitis and bronchopneumonia due to hoose when examining these animals, especially during the autumn. Tuberculosis becomes more common at the age of three years, as it is when approaching this age that the animals are housed. Most cases are met with between the ages of three to eight, from twelve onwards the decrease in cases is very noticeable. It would appear that an animal which has resisted the disease so long has gained a certain amount of immunity.

"Every picture tells a story." This applies very forcibly to tuberculosis, even though very often we could not say what, in the appearance of the animal, tells us the tale: as a rule, an

animal affected for any length of time is tucked up, has a dull coat, a bright but possibly sunken eye. At this time of the year an animal not yet coated will attract attention. Animals are often first noticed for this reason and also because they do not thrive on grass as well as their companions in the herd.

There is no doubt that there is such a thing as the possession of a tuberculosis instinct, probably the result of experience, especially that gained when young, acting on the subconscious mind. How many of you have examined an animal by all clinical methods, could find no evidence of tuberculosis and yet destroyed her and proved on *post-mortem* examination that your instinct was superior to your senses?

When in doubt as to the presence of tuberculosis [Form (iii)] a sample of sputum should be taken, examined microscopically and, if necessary, it should be subjected to the biological test.

I fear, however, that long journeys and the present economic value of cattle discourage us in the use of this most valuable means of diagnosis. There is no excuse for not employing it when the value of the animal is likely to be high, especially when clinical examination does not lead to definite diagnosis.

A sample of sputum is best collected by getting the animal to cough on to a smooth surface (such as a sheet of glass) held before its mouth, and collecting the deposit on the glass, thus obtained, into a sterile bottle. This sounds simple, but in practice the animal is not always too obliging in respect of the coughing part. Coughing is a reflex action, suppressible to a certain extent, and induced as a rule by irritation of the vagus nerve endings in the respiratory tract. The most sensitive branch of the vagus in this respect is the superior laryngeal, sensory nerve to the larynx and the first three tracheal rings. In a healthy bovine it is almost impossible to induce coughing by pressure in this last-mentioned region, but I understand that there are experts in this direction. A method more commonly recommended is to close both nostrils for a short time. This is sometimes difficult to carry out and not uniformly successful. Punching the animal's ribs may have the desired result. If these methods fail, or in preference to them, coughing can be produced with certainty by introducing the stomach tube through the nostrils and into the larynx instead of into the œsophagus. If the animal does not cough when the laryngeal mucous membrane is irritated, the tube should be inserted until it reaches the bifurcation of the bronchi, when the desired result is always obtained.

Before this method was thought of, on one occasion a Hereford bull could not be induced to cough by any of the ordinary measures. His nostrils were wiped with spirit and brisk exercise was given, which brought on coughing and the fresh nasal discharge was collected. It proved positive to the microscope and biological test. Samples collected from walls of byres are usually unsatisfactory.

From the sputum a thin film should be made, stained by the Ziehl-Neelsen method and examined microscopically. The bright red rods are more easily made out when present here, than in films prepared from milk samples. Finding the bacilli makes diagnosis positive, but when they cannot be found the sample should be subjected to the biological test. The disadvantage of this latter test is the delay necessitated for the maturing of the result.

I understand that in miliary tuberculosis of the human subject the bacilli are not found, as a rule, in the sputum, and I am wondering if the same thing applies to the bovine.

Post-mortem Diagnosis

Even *post-mortem* it is not always possible to tell by naked-eye examination whether tuberculosis exists or not. The chief things liable to be confused with it now are chronic pneumonia and carcinoma.

When the former exists the lesions are more diffuse than is the case in tuberculosis, the lung has a more uniform and a softer feel and there is an absence of grating on section due to the absence of caseation. The pus is more liquid and paler in colour. With tuberculosis each lesion is isolated from its neighbour and surrounded by a zone of fibrous tissue which varies considerably in thickness. The material within the lesions is yellow, caseous or caseo-purulent. When tuberculosis is present, in 99 per cent. of cases the bronchial or mediastinal glands contain a lesion which is quite typical. In chronic pneumonia the rule is that the glands are œdematous and enlarged but rarely contain a lesion. Occasionally one does meet with a purulent centre in one or more of these glands but the lesion is soft and pale in colour, is not surrounded by fibrous tissue and the contents are liquid. If lesions of tuberculosis are found elsewhere in the carcase it makes the diagnosis of this disease in the lungs more easy and definite.

Carcinoma affecting the lungs, pleura, peritoneum and omentum can be very confusing sometimes, the chief points of difference being the absence of caseation except in very large lesions of carcinoma (when present the caseation is more firm and diffuse) and the absence of the typical lesions in the lymph glands, even though these may be enlarged and cancerous. The "grapes" in tuberculosis are pedunculated and often large; those due to carcinoma are usually small, flat and more numerous.

Fluke cysts could never be mistaken after death for tuberculosis owing to the characteristic feel and distinctive contents. I had great pleasure in finding a live fluke in one of these lung lesions last week—rather an unusual occurrence.

Advanced tuberculosis was present in 8 per cent. of cases. This is a low percentage and is getting lower, due to the fact that farmers are more educated in respect of the disease, are very anxious to rid their herds of infected stock and lose no time in bringing any suspicious case under notice.

The tuberculin test is of limited value as an aid to diagnosis under the Order, where we have to determine not only the presence but also the extent and site of the disease: the tuberculin test unfortunately does not give the slightest indication as to the extent of the lesions in the body. In certain circumstances, however, its value cannot be overlooked, as, for example, in cases of suspected tuberculous mastitis where a negative reaction would put tuberculosis out of the question and a positive one would make diagnosis fairly certain.

A negative reaction at any time, except when the animal is *in extremis*, rules out tuberculosis, but a positive reaction will by no means bring an animal under the Order unless definite evidence of tuberculosis can be made out in one of the situations already mentioned.

The test can only be applied with the owner's written consent and for the purpose of the Tuberculosis Order it is rarely required. The selection of the type of test is best left to each individual, but the intradermal test has sensitivity and convenience to commend it.

In conclusion, I wish to apologise for repeating to you things which you are, perhaps, tired of hearing and for describing things which you meet with daily, but it is difficult to get original things to say when speaking on such a subject purely from the clinical side.

If I have given you material for a good discussion and plenty of criticism my efforts will be amply rewarded.

Discussion

Mr. C. P. Hynes, Waterford, who opened the discussion, first expressed his thanks to the essayist for his very interesting and practical paper. Mr. Hynes added that it was a pity the paper had not previously been circulated: it was difficult to remember all the points, as the essayist had to cover a wide and important subject. This, however, he appeared to have done in a creditable and detailed manner.

Mr. Pierse's methods of diagnosis by auscultation and percussion might sound somewhat academical to the hardened practitioner: he would like to know whether, by these methods, Mr. Pierse could determine whether he was dealing with a case of chronic bronchopneumonia or one of pulmonary tuberculosis. Bronchopneumonia was one of the roads on which the profession frequently perished, and in some districts it appeared to be more prevalent than in others. He found the question sometimes difficult to decide, but was led to a conclusion, more or less, by the character of the cough and by the general appearance of the animal. The cough of bronchopneumonia was usually loud and explosive with a strong follow-on. A certain poked-out attitude of the head he thought rather diagnostic of pulmonary tuberculosis, which was accompanied by a softer and more suppressed cough. However, there was no hard and fast rule and one had to be guided by experience and sometimes take a chance.

He was rather surprised to hear that in all cases of tuberculous enlargement of the prescapular gland the lungs would be affected. This was not his experience; in fact, in many cases of enlargement of the superficial lymphatics, especially in younger cattle, no microscopic lesions were found in the viscera. His view was that these superficial glands acted as a trap for the bacilli and prevented a general invasion, at least for the time being.

Referring to methods of collecting sputum, Mr. Hynes asked Mr. Pierse if he had ever tried the insertion of a small trochar into the trachea. He had devised a method whereby a trochar was inserted and a piece of flexible lead wire with a small mop of cotton wool secured at the end was pushed through the canula into the windpipe. This was usually followed by coughing and he thought he readily obtained a fairly pure culture on the cotton wool. On the whole he thought there was very little in Mr. Pierse's paper open to criticism, and he was surprised at the amount of practical knowledge and keen observation so young a practitioner displayed.

[At a later stage, during the discussion on tuberculosis of the udder, Mr. Hynes described a recent interesting case of primary tuberculosis of the udder. A cow which had calved about a month previously developed a tremendous enlargement of the left fore and hind quarters. A tentative diagnosis of a proliferating mastitis was given. The cow, however, rapidly wasted and was destroyed. *Post-mortem* examination showed the quarters of the udder referred to to be one huge lesion of tuberculosis, but so far as a careful field *post-mortem* examination could carry the matter no other macroscopic tuberculous lesions could be discovered.]

Mr. P. Harnett, having congratulated the essayist, said that he would like to call the attention of practitioners to the diagnosis of tuberculous mastitis by the examination of the milk cells under the low power of the microscope. "The procedure is simple," said Mr. Harnett. "A sample of milk is taken from a suspected quarter. About 15 c.c. of it is centrifuged for about five minutes at about 1,000 revolutions per minute in a hand centrifuge. From the deepest layer of the deposit a loopful is taken, spread out on a slide, dried in air, fixed by gentle heat and stained with methylene blue. The slide is now examined under the low power and in a typical case of cell grouping, endothelial cells will be seen in loose groups either placed concentrically around an amorphous centre or in irregular groups. These cells are larger, more defined and stain less deeply than ordinary milk cells. Some authorities look upon their presence as diagnostic: it is at least most suspicious. Once these cells have been pointed out to a beginner, they are afterwards

easily identified. For a practitioner the procedure is simple and the apparatus is not expensive. The presence of acid-fast organisms is not always diagnostic of tuberculosis, as I have sometimes discovered acid-fast organisms in a sample of milk which proved negative to the biological examinations. The history of a herd is an aid to the diagnosis, as one often finds that the successors to, or neighbours of, an affected animal fed at a certain post in a shed also develop the disease. The purpose of the Tuberculosis Order is to detect open cases of tuberculosis. The majority of such cases occur through the organism being coughed up from the lungs out of the mouth or else swallowed and passed out in the fæces. This happens when the lung substance is affected. In Limerick slaughterhouses, up to 40 per cent. of affected animals of all ages are affected in the lung substance. The late Dr. Stenhouse Williams examined the fæces of 135 apparently healthy cows and found that 18 contained tubercle organisms. Sterility must be looked upon as a suspicious symptom: about 6 per cent. of tuberculous animals met in meat inspection are affected in the uterus. Uterine discharges, particularly at œstrum, and urine, where the kidney is affected, must be sources of tubercle organisms."

Mr. O'Donovan wished to be associated with the vote of thanks to Mr. Pierse and complimented him on his very practical paper which also showed his admirable regard for detail. Having explained the difficulties of having a paper circulated to the members before the meeting, both for the essayist and for the Association, Mr. O'Donovan said that he would much have appreciated the opportunity of reading the paper before the meeting as every aspect treated was of great importance to every member of the profession and especially at the present time, when the eradication of bovine tuberculosis was much discussed.

Referring to some points raised by Mr. Pierse, Mr. O'Donovan first dealt with the essayist's statement that the supramammary lymphatic gland was not of much importance in the diagnosis of tuberculous mastitis. He preferred the statement that "it was of no importance." He mentioned the large percentage of cases where the lymphatic gland was affected and the udder free, and on the other hand the numerous cases where the mammary tissue was affected and the lymphatic gland showed no lesion and no change in size.

Actinomycosis of the udder was still a rather ill-defined term. Certainly cases of true actinomycosis or bacillosis of the udder were rare. He knew of only a few cases of actinobacillosis and had proved no case of actinomycosis of the udder in the cow.

Concerning cows exhibiting "definite clinical symptoms and chronic cough," the speaker asked, what was the definite clinical symptom besides the chronic cough? Enlarged glands could not be taken into account as they were rare and more rarely still accompanied by a cough. The chronic cough itself, whether accompanied by poor condition or not, was the definite clinical symptom. What was a chronic cough? He was satisfied, as far as a cow in a shed was concerned, that the finding of sputum on the wall in front of her and demonstrating tubercle bacilli from a sample directly obtained from her was sufficient evidence that the cough was chronic and due to tuberculosis. There were cases of chronic cough not due to tuberculosis and the chronic pneumonia mentioned by Mr. Pierse was the cause of most of these cases. Indeed, those cases gave every detail of the tuberculous picture, but there were no tubercle bacilli. He thought that the typical tuberculous cough was not such a typical thing after all. Cows varied immensely and also indeed there were many tuberculous udders beyond what one described as the typical tuberculous udder.

Mr. O'Donovan next referred to Mr. Harnett's remarks about acid-alcohol-fast bacilli in samples taken direct from the udder, and said that he had never found acid-alcohol-fast bacilli in samples taken direct into a sterile bottle that were not tubercle bacilli. He considered the presence of cell groups a great aid to diagnosis, but could not classify them as diagnostic. He found tubercle bacilli in samples where no cell groups could be discovered in the films, and found cell groups as typical as he could classify them in definitely negative cases. Mr. O'Donovan concluded by saying that this subject was of great interest to every member of the Association whether he be practitioner or whole-time or part-time inspector.

Annotations

VARIABILITY OF THE TUBERCLE BACILLUS

The question of the variability of the tubercle bacillus should be studied from two angles. In the first place, has this organism a complicated life cycle, during one stage of which it exists as a filtrable virus? An immense amount of work has been published of recent years in support of the existence of a filtrable form of the tubercle bacillus; Christenson, Mellon and Fisher, Fontes, Nègre, Valtis and van Deinse, Fejgin, Aubertin and Reynes, and Ninni being a few of those who have upheld this theory. More recent work by Downie and Meissner (1934) [*Zlb. Bakt.* Orig. 130, 465] and by Cooper (1934) [*J. Inf. Dis.* 54, 236] as well as by others has done much to contradict any theory of the filtrability of acid-fast organisms. Owing to the numerous pitfalls which await those who carry out filtration experiments an outside observer is tempted to place more trust in negative than in positive filtration experiments of this type.

The other type of variation is the "rough" to "smooth" change. This subject has also received considerable attention, recent workers including Steenken, Oatway and Petroff; Reed, Orr and Rice; Pagel and in particular Birkhaug (1935) [*Ann. Inst. Past.* 54, 195-244]. The last-named worker, in a lengthy, fully illustrated and extremely interesting publication, has set out his own findings in this connection. His findings are generally in keeping with those of most other workers and they are set out as follows. Tubercle bacilli dissociate into three

main kinds, each form being convertible to another variety by suitable cultural means, as well as *in vivo*. The forms are rough "R," smooth "S" and chromogenic "Ch." They have been studied by single-cell culture. The "S" and "Ch" forms show a "diphasic" growth in broth, *i.e.*, there is a primary diffuse turbidity followed by formation of a smooth pellicle. The "R" variant produces a surface growth only. The mammalian "S" and "Ch" varieties produce an acid reaction whilst the "R" variety turns broth medium alkaline; on the other hand, the avian type of organism produces exactly the reverse hydrogen ion changes.

As regards pathogenicity, "Ch" types, either avian or mammalian in origin, are avirulent for laboratory animals. The mammalian "S" variety is slightly virulent for laboratory animals when administered in large doses, but this virulence is lost by passage. The "R" variety is highly virulent for such animals producing typical tuberculous foci, and this virulence is maintained during passage. On the other hand, with the avian strains the "S" variety is relatively virulent whilst "R" varieties are avirulent.

With B C G [originally a mammalian strain of tubercle bacillus] the "R" variety is avirulent except in excessive doses. The "S" variety, on the other hand, shows some slight tendency towards virulence which is, however, lost after subculture.

In the foregoing work Birkhaug has studied variation of the macroscopic appearance of colonies, and he has retained the smooth, rough, chromogenic, nomenclature suggested by Petroff. Pagel (1934) [*J. Path. and Bact.* 39. 689], examined variations of tubercle bacilli within the tuberculous focus and within the growing colony. He described finding non-acid-fast granules, acid-fast bacilli, intensely acid-fast bacilli and chromophilic zoogloea. Of these types the chromophilic bacilli appear to be associated with rapid growth. The manner of distribution of chromophilic bacilli differs in rough and in smooth colonies, whilst this chromophilic type, though not more virulent than ordinary acid-fast rods, produces more rapidly growing foci of infection. At present the true relationship between types of organism described by Pagel and types of colony described by Birkhaug is obscure. In this connection it is necessary not to confuse the "Ch" or chromogenic colony of the latter worker with the chromophilic bacilli of Pagel.

From the foregoing survey it will be seen that, whilst the question of the variability of the tubercle bacillus allows of an immense amount of speculation and research of a rather academic nature, the point of practical interest which emerges is that, like *B. anthracis* and unlike the majority of other pathogenic bacteria, the rough variant of mammalian tubercle bacillus is virulent whilst the smooth variant is avirulent; whereas with the avian type of tubercle bacillus the reverse is the case.

E. J. P.

* * * * *

PASTEURISATION

The study of the pasteurisation of milk is an old one, and the questions of the value of heat treatment for the destruction of pathogens and of the effect of heat upon the nutritive value of milk have been discussed at great length in the literature. In 1925 C. E. North and his co-workers issued a critical experimental review of the efficiency of various large pasteurising plants. [Pub. Health Bull. Washington. No. 147. p. 215]. In 1929 Zeller, Wedemann, Lange and Gildemeister [*Arbeit Reichgesundheit.* 61. 1-72] published a review of the literature together with the results of some of their own investigations. These two publications cover the whole field of information available at the time. The general conclusion reached by both sets of workers was that "holder pasteurisation" could be relied upon to kill pathogens provided a suitable type of apparatus was used and provided that such apparatus was operated in an efficient manner by skilled technicians. "Flash pasteurisation," on the other hand, even using the best apparatus, was apt to be unreliable. Investigators working more recently have tended to confirm these general statements. Flash pasteurisation remains in the experimental stage, whilst in the report of the Corporation of Manchester (1931) it is reported that 2 per cent. of so-called pasteurised milk samples contained tubercle bacilli; J. Smith (1932) [*Jour. Hyg.* 32. 354] found 2 per cent. of 187 pasteurised samples thus contaminated; in the report of the Medical Research Council (1933) [*M.R.C. Spec. Rep. Ser.* No. 189] it is stated that in 2·8 per cent. of 1,243 samples tubercle bacilli survived holder pasteurisation. In these investigations no attempt was made to select samples from efficient pasteurising plants; reliance was placed entirely upon the claims of the dairies concerned, and it is probable that contaminated samples had come from inefficiently-run plants or contained an admixture of unpasteurised milk. Pullinger (1934) [*Lancet.* I. 967] found no tubercle bacilli in 63 pasteurised samples, whereas samples taken from the same batches of milk prior to pasteurisation in every case contained this contaminant.

Tuberculosis and *Br. abortus* are the really important infections common to bovines and human beings. Figures indicating the incidence of the two contaminants in milk supplies, as

found by various workers, are noted by Pullinger (1934). According to district, from 37 to 100 per cent. of large rail tanks of ungraded milk contain tubercle bacilli and 84 per cent. *Br. abortus*, whilst 70 out of 101 samples of milk from 45 tuberculin tested herds contained the latter contaminant. The danger of infection of human beings, and particularly of children, with bovine tuberculosis is well known, whilst the significance of *Br. abortus* as a serious menace to the health of the human subject is gradually being recognised. In this latter connection one can quote a recent publication by Beattie, Smith and Tulloch (1935) [*Lancet*. I. 1427]. These investigators described 97 cases of undulant fever due to *Br. abortus* in human beings. Of these, 83 were people who, for medical or other reasons, were heavy milk drinkers. The authors stress their opinion that mild cases of infection pass undiagnosed.

In addition to undulant fever and tuberculosis, milk may be contaminated with various other organisms harmful to human beings; these include scarlet fever, septic sore throat, diphtheria, typhoid fever, paratyphoid fever, salmonella food poisoning and staphylococcal food poisoning. The staphylococcus probably originates from the udder of the cow, *Strep. pyogenes* may do likewise, though contamination usually occurs during or after milking; the other contaminants mentioned usually originate from outside the cow. This long list of pathogenic contaminants of intramammary and extramammary origin indicates the grave need for adopting measures to safeguard the health not only of the milk-consuming public, but also of those who consume milk products; for it has been shown that cream, ice cream and butter may also contain some of these contaminants.

Since "holder pasteurisation" at 62°C. for 30 minutes, when carried out properly, destroys tubercle bacilli as well as the other contaminants mentioned, the theoretically ideal safeguard would appear to be holder pasteurisation of bottles of milk which could then be sealed and immediately distributed to the public. In practice, the satisfactory pasteurisation of bottled milk presents various difficulties which render this method less efficient than pasteurisation of large bulks of milk in suitably constructed "holders." The general requirements for an efficient pasteurising plant have been discussed in the two theses quoted at the beginning of this annotation. The main features are that the milk must be raised to the pasteurising temperature before it enters the "holder." Within the "holder" it must be maintained at 62°C. for a minimum period of 30 minutes and be so mixed that every portion of the milk remains at the maximum temperature all the time; at the same time, mixing must not cause marked frothing. Inside the "holder" there must be no dead ends in pipes or stopcocks where the maximum temperature is not attained. During pasteurisation the temperature inside the "holder" must be registered continuously by an automatic thermograph. The milk must be cooled to refrigeration temperature immediately it leaves the "holder," and should then be bottled and sealed with the minimum amount of human manipulation. Finally, all piping, preheating, "holder," cooling and bottling apparatus must be steam sterilised after use in readiness for the next "run."

Where the above conditions are rigorously fulfilled, pasteurisation can be relied upon to make milk safe for human consumption. Obviously, however, there is considerable opportunity for failure of the human element, even where suitable apparatus is installed. For this reason licensing and control of all pasteurising plants by the Government or local authority is most essential, and the necessity for such control has been urged strongly by Savage (1933) [*J. Hyg.* Camb. 33. 42] and by Dalrymple-Champneys (1935) [*Min. of Health. Rep. on Pub. Health and Med. Subjects*, No. 77]. In addition to control of pasteurising depôts it is also needful to control the sale of pasteurised milk in shops and on the street by buying samples and testing them for evidence of adequate pasteurisation. In the past no really satisfactory test for this purpose has been available, but a new phosphatase test, described by Kay and Neave (1935) [*Lancet*. I. 1516] gives promise of filling this need.

As regards the suitability or otherwise of pasteurised milk as a food, there is considerable diversity of opinion, which has arisen largely from the unjustified assumption that "what is bad for the rat is bad for the baby." The chemical aspect has been studied recently by Stirling and Blackwood (1933) [*Hannah Dairy Research Institute Bulletin*], who found that, as the result of pasteurisation, 5 per cent. of albumen was coagulated, the calcium and phosphorus content was very slightly altered, whilst about half the vitamin C was destroyed. According to Savage (1933) [*Lancet*. II. 429] the milk protein, fat and lactose contents of milk are practically unaltered, as are vitamins B_1 and B_2. About 20 per cent. of vitamin C is destroyed. These figures indicate that, as a food for human beings, pasteurised milk differs from raw milk only in respect of vitamin C, which is easily supplemented, *e.g.*, by orange juice. Some evidence exists to suggest that calves fed on pasteurised milk show signs of malnutrition; pigs fed pasteurised milk absorb less calcium and phosphorus from a supplementary ration of cereal than do those fed raw milk; rats fed pasteurised milk make poor

growth, but this is sometimes the case when they are fed raw milk. At present experimental evidence regarding the suitability or otherwise of pasteurised milk for human beings is lacking. On theoretical grounds such milk, with a supplementary allowance of vitamin C, would appear to be absolutely suitable for human beings and, until adequate experimental evidence is produced to disprove this view, it would be a mistake to lay too much stress upon the results of investigations on rats and calves. Experimental and statistical data regarding the value of raw and heated milk as a food for children is being collected, but the results will not be available for full analysis for some years to come.

E. J. P.

Abstracts

[Foot-and-Mouth Disease: The Fixed Virus Types. Daubney, R. (1934.) *J. Comp. Path. and Therap.* **47.** 4.]

This paper records experiments on the relationship of certain African field strains of virus to the recognised "fixed" virus types, "O," "A" and "C." The author casts doubt on the occurrence of true "fixed" types in cattle, and suggests that his findings support those of Manninger, that type mutation can occur during field outbreaks, which may lead to the reinfection of cattle recovered from infection with the virus in its previous state. This conclusion is based on the ability of the second strain of Rhodesian virus examined (Msase virus), to infect animals recovered from the first Rhodesian virus examined (Belingwe virus), there being field evidence of the continuity of the two strains.

Three viruses from Kenya were studied. The first (Kabete virus) had at its early passages factors common to "A" and "C" types, failing to infect guinea-pigs immune to these types, while infecting "O" type immunes. At the 30th serial passage in guinea-pigs, however, this virus became a fixed "A" type in guinea-pigs. The two other Kenya viruses examined were similar. One of these (Cowie virus), was collected one year after the Kabete virus, and the author submits that "this having in all probability been maintained unchanged in cattle . . . more than twelve months . . . the particular type should be accepted as a relatively stable one in cattle."

Two Rhodesian viruses were subsequently studied. The first of these (Belingwe virus), originally an "O" type virus in guinea-pigs, terminated as an "A-C" type virus resembling the cattle Kenya strains, but with no subsequent change to pure "A" as with these latter. This is remarkable, as "O" virus is generally regarded as stable. The second Rhodesian virus (Msase virus) was able in its early passages to infect guinea-pigs immune to "A" and "C" viruses, without conferring immunity to subsequent inoculation with "O" virus, and to infect "O" immunes up to its ninth passage in guinea-pigs. At the 15th guinea-pig passage, however, the virus had acquired true "O" characteristics for both guinea-pigs and cattle.

These results are interesting, but as the experimental procedure is far from clear in some respects, and in others is open to severe criticism, a true assessment of the value of the work is difficult.

Referring first to a grave deficiency of the major part of the guinea-pig work: of some 175 tests of the susceptibility of immune guinea-pigs to known and unknown strains of virus, 21 were made on groups of three guinea-pigs, 103 on groups of two, and in eight instances one guinea-pig only was tested. Results based on such small numbers can carry very little weight. In approximately 60 per cent. of the tests, one or two guinea-pigs only are used. In such circumstances, experiments with "variant" strains are open to sampling errors to such an extent that there is probably an even chance of 100 per cent. positive or 100 per cent. negative results at any one experiment. A consideration of the author's own results is sufficient to indicate that these numbers cannot cover statistical errors.

Furthermore, as the possibility of complete mutation of type between any two successive passages in the guinea-pig cannot be excluded, the procedure frequently adopted of grouping in one test animals recovered from several different passages of a virus (*e.g.*, fourth to tenth passage immunes, Table 1), if indeed it does not render inconsistencies meaningless, needlessly complicates any consideration of results: as also does the somewhat random selection for comparative tests of all passages from the second to the 53rd. Some sort of standardisation in this respect is very desirable.

The author uses the notation ± to denote "doubtful local vesicles which receded without rupturing," and "L" to denote a local reaction only (without generalisation), both resulting from test inoculations of immune guinea-pigs. It is the opinion of the writer, and of other workers with considerable experience in this field, that where *bona fide* generalisation has occurred in guinea-pigs at a first inoculation with virus, local reactions, definitely attributable to the virus of subsequent inoculations, cannot be recognised with any degree of certainty. A regular transient effect resulting from the reinoculation of sensitive tissues, and more particularly, purulent reactions, independent of virus, and due to bacterial contaminants

(particularly common where unfiltered inocula are used), cannot with confidence be excluded. It is not denied that local reactions without generalisation can and do occur, but their recognition is difficult, and involves personal factors to too great an extent, to permit of their constituting a satisfactory criterion of breakdown of immunity in the guinea-pig. The author bases too many of his conclusions on such purely local reactions. In his table V, for example, he shows a nicely graded result in his tests of "A" virus on successive passages of the Cowie virus, based entirely on such evidence. "Local" and "doubtful local" reactions with no generalisation, are recorded up to the tenth passage, tests on subsequent passages being negative, and this is claimed as proof of progressive acquisition of "A" characteristics. All the guinea-pigs were later tested with "C" type virus, and here, where primary *and generalised* lesions resulted in the immunes of the later passages of Cowie virus, there is unequivocal evidence of the loss of "C" components. In the preliminary tests with the "A" type virus, however, the evidence of the absence of complete "A" immunity at the earlier passages of the virus, based as it is on these "local" and "doubtful local" reactions, is rather unconvincing. Furthermore, neither in this nor in any other part of the paper is there any indication as to the dates on which the various guinea-pig tests were made. No idea can therefore be formed as to the time interval between any two inoculations, and the particular results referred to above could be easily interpreted if the earlier passage guinea-pigs had had a disproportionately long period for recovery, with partial loss of immunity, in which circumstances local reactions without generalisation would be observed with a homologous strain of virus.

No mention is made at any time of controls of the viability of the test viruses. One would have liked some assurance that all inoculations of virus into immune guinea-pigs were controlled by simultaneous inoculations of healthy guinea-pigs. For example, when at the eleventh passage the Kabete virus failed to infect guinea-pigs immune to "A" and "C" type viruses, one has only an implied assurance that the test inoculum was potent. Without such controls, all immunity tests with negative results are of course meaningless.

As the reverse test ("A" and "C" type viruses on Kabete immunes) also failed to provoke more than "local reactions," the author remarks: "The virus (Kabete) appeared to overlap these two strains perhaps to a greater extent than in any previously recorded instance . . . a test was promptly set up to verify the independence of the 'A' and 'C' strains received from Weybridge." In this test, four "C" immune guinea-pigs were tested with "A" virus, and reacted fully, and "C" and "A" immunes were inoculated with Kabete virus and then with "A" and "C" types respectively. The first test of "C" immunes with "A" virus does establish a difference between these two viruses; but it does not establish their complete independence. It establishes the absence of "A" type antigens from the "C" virus, but it does not establish the converse—absence of "C" type antigens from the "A" virus, to accomplish which the reverse test, of "C" virus on "A" immunes, was required. This reversal was effected in one of the succeeding tests, but the intermediate inoculation of Kabete virus, the unknown factor, completely invalidates it as any indication of the purity of the stock type strains in question.

The author concludes: "Normally . . . the state of a virus in cattle is such that, while the virus should probably be considered as polyvalent, one type component is predominant, and fixation in the guinea-pig results in suppression of the weaker factors . . . fixation does not always take the same direction, and therefore the type eventually fixed in guinea-pigs does not necessarily indicate the component that was predominant when the virus was last spreading naturally." This is an interesting postulate, and one which may possibly account for the many contradictions of type determination in the guinea-pig, and the discrepancies of comparative guinea-pig and cattle typing, that have been disclosed by recent work. There is little doubt that many of the accepted concepts in this field will have to be revised in the near future, and Daubney's investigations will certainly stimulate interest in this direction. It is most regrettable that technical deficiencies should depreciate to such an extent what would otherwise have been a most valuable contribution.

E. O. L.

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[The relation of the Avian Tubercle Bacillus to Tuberculosis in Swine and incidentally in Cattle. McCarter, J., Beach, B. A., and Hastings, E. G. (1935.) *J. Amer. Vet. Med. Ass.* **86.** 2. 168.]

From the tuberculous lymphatic glands of 61 pigs in Wisconsin the authors recovered 41 cultures of the tubercle bacillus, all of the avian type. Preliminary isolation was made on Dorset's egg medium, and the strains were further identified by inoculating guinea-pigs and rabbits. After five months the guinea-pigs were killed and none showed visible lesions of tuberculosis, whereas the rabbits all succumbed within two to three weeks to the Yersin type

of the disease. The significance of these findings is the consideration of the pig as a reservoir for maintaining the vitality of the avian tubercle bacillus and the consequent relationship of this problem with that of tuberculosis in chickens and of the eradication of bovine tuberculosis due to infection with the avian type. **S. J. E.**

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[Some Results of the Application of a Simple Test for Efficiency of Pasteurisation. Kay, H. D., and Neave, F. K. (1935.) *Lancet* **228.** 1516-1518. (3 refs.)]

This paper describes the results obtained on applying the phosphatase test to "pasteurised milks" bought in various towns and rural areas in the open market. This test depends upon the presence of an enzyme—phosphatase—in milk. The presence and quantity of this enzyme can be detected readily; it is present in all raw milk but has the convenient property of being almost completely destroyed by "legal" pasteurisation (heating at a temperature of not less than 145°F. and not more than 150°F. for at least half-an-hour, and immediately cooling to a temperature of not more than 55°F.), but of not being completely destroyed if the milk is heated at a lower temperature than 145°F. or for a time less than 30 minutes at the correct temperature. Thus by means of the test inefficient pasteurisation can be readily detected. The presence of 0·25 per cent. of raw milk in a pasteurised milk can similarly be readily detected. The results of the examination of 82 "pasteurised" milks are given and of these only 45 were found to be efficiently pasteurised. Of the others eleven were "incorrectly" pasteurised, whilst the remaining 26 were considered to be either grossly under-heated or raw. The authors draw the following conclusions:—

(1) A large number of pasteurising plants of all sizes both in London and elsewhere are either inherently functionally inefficient or unsatisfactorily operated.

(2) The properly-designed and supervised plants, whether large or small, provide a satisfactory product. The phosphatase test has proved a valuable aid in this supervision.

(3) Of the large firms a majority, but by no means all, use efficient plants and/or methods.

(4) The milk sold to school children as "pasteurised" appears, in a large number of the cases examined, to have been pasteurised in a particularly amateurish way.

(5) In view of the large percentage of designated "pasteurised" milks on the market which have been grossly under-heated it is particularly desirable that all milk, and especially milk that is to be consumed by school children, should reach a reasonable hygienic standard—say, Grade "A"—before pasteurisation.

W. R. W.

[Calf Paratyphoid in Italy. Strozzi, P. (1934.) *Clin. Vet. Milan.* **57.** 5. 337-354. 4 tables. **3 figs. on 1 plate. (44 refs.)]**

The author reviews the literature on calf paratyphoid and gives an account of 14 cases which came under his own observation. The affected calves varied in age between eight and 90 days; two to three weeks, however, was the common age for the disease to appear. In acute cases the onset of the disease is sudden, in other cases the animals become dull, lie down frequently and have difficulty in getting up. At this stage the temperature is 41° to 42°C. and the pulse 110 to 115, becoming small and irregular. The animals show no desire to suckle and refuse all food offered to them. There is constipation at first, but diarrhœa soon follows; this is yellowish in colour and may be blood stained. Pulmonary disturbances often appear later with severe dyspnœa and abdominal respirations. Death occurs in two or three days and in those cases which recover the disease lasts eight to 14 days.

On *post-mortem* examination, the most constant lesions are enlargement of the spleen, fatty degeneration of the liver (which is very friable), peritoneal and pleural hæmorrhages and sometimes areas of hepatisation in the lungs. In all but two cases of the outbreak discussed pure cultures of small, motile Gram-negative organisms were isolated. These gave the cultural reactions of the Salmonella group and complete agglutination was obtained with anti-*Salmonella enteritidis* Gärtner serum. Further serological examinations showed that the organisms were the Dublin type of Salmonella which are highly pathogenic for calves and have occasionally caused severe disease in man. **J. A. N.**

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[Vertebral Angioma of Calves. Brochet, L. (1934.) *Rev. Gén. Méd. Vét.* **43.** 512. pp. 448-462. (10 refs.)]

This article describes the condition as met with in dressed carcases at a large slaughter-house. From numerous cases seen in various stages of the disease, the evolution of the lesion appears to be the following: A large blood vessel is first noticed in the region of the intervertebral disc without any sign of bone disease. The vessel further dilates with erosion of the underlying intravertebral disc, and the vertebra itself becomes involved. The lesion progresses until the whole of the intervertebral disc is absorbed and large cavities in the adjoining vertebræ become filled with blood and blood clots. The author discusses the probable future evolution of the lesion, and emphasises the importance of distinguishing it from abscess formation in bones.

In one case decalcification of the bones suggested that disease of the parathyroids may be a cause of the condition (as has been described in human cases).

The condition was frequently found, and a similar condition may involve the neck of the femur and head of the tibia, as noted in human cases and one horse case, but such sites could not be easily examined without damage to the carcase. From a food point of view the condition is benign. C. V. W.

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[**Two Cases of Alopecia in Cattle.** Teichmann, O. (1934.) *Deuts. tierärztl. Wschr.* **9.** 42. 129-133.]

Details of two cases of alopecia areata in Holstein cows are reported by the author. In view of the rarity of the condition it is remarkable that both cases should occur on the same farm. The hairless areas appeared as round isolated patches over the whole of the body. Although a thorough examination was made, no conclusion as to the cause could be reached.

N. S. B.

REARING SHEEP AT 1,500 FEET

In a recent issue of *The Sunday Times* the Cardiff Correspondent of that paper draws attention to the success attending an experiment of hill land reclamation and the improvement of grazing at a height of 1,500 feet above sea level carried out by the Department of Agriculture at the University College of Wales, Aberystwyth, thanks to benefactions by Sir Julien Cahn and Mr. Lloyd George.

"As a result of these experiments, land which used to carry one sheep and one store lamb to three acres now carries three or four ewes to the acre, with their lambs. This result has been a revelation to Cardiganshire farmers, who believed that no lambs could be fattened at any height above 900 feet. Furthermore, it opens up possibilities for the future, for there is a vast acreage of similar land in Wales, which has gone out of cultivation, but which the recent experiments have shown to be capable of improvement.

"The scene of the experiments is on the Hafod estate, in the Cardiganshire hills, not far from the Devil's Bridge. About 3,000 acres comprise the section for experiment, 2,000 acres of which is a sheep run varying from 1,300 feet to 1,800 feet above sea level. When the scheme is fully developed it is hoped to dispense with the necessity for bringing sheep to the lowlands for the winter. A portion of the hill was grassed out in 1933, and in 1934 about 800 lambs were fattened there and sold in English cities."

* * * * *

A vast national food scheme, designed to raise the standard of the people's physique and to aid agriculture, is being considered, the *Daily Telegraph* understands, by Government departments. The plan provides for the creation of a "Food Department," which would provide a link between the Ministries of Health and Agriculture. The new department would have at its disposal a subsidy—which it is estimated need not exceed the amount paid to existing marketing boards—and would use the money for the reduction of essential food prices.

Report

The Report of the Poisons Board in regard to the Poisons List and Draft Poisons Rules prepared in accordance with the Pharmacy and Poisons Act, 1933*

For the purposes of The Pharmacy and Poisons Act, 1933, there was appointed an advisory committee, referred to as the Poisons Board, whose duty it was to prepare and submit for the approval of the Secretary of State a list of the substances which are to be treated as poisons. This list was to be divided into two parts: Part I to consist of those poisons which are to be sold only by a person who is an authorised seller of poisons (and that is a Member of the Pharmaceutical Society), and Part II to consist of those poisons which may be sold not only by authorised sellers of poisons, but in addition by persons whose names are entered in a list kept by the local authority. In addition, the Poisons Board was to make rules with respect to the manufacture, sale, storage, transport, labelling and other matters appertaining to poisons.

The Board comprised:—

Four members appointed by the Home Office.

One member appointed by the Secretary of State for Scotland.

Two members appointed by the Ministry of Health.

One member appointed by the Ministry of Agriculture.

One member *ex officio* as Government Chemist.

Four members appointed by the Pharmaceutical Society.

One member appointed by the Royal College of Physicians, London.

One member appointed by the Royal College of Physicians, Edinburgh.

One member appointed by the General Medical Council.

One member appointed by the Institute of Chemistry.

One member appointed by the British Medical Association.

The publication under discussion comprises the Poisons List and Rules prepared by this Board.

The risks against which the control of poisons is directed, are:—

The danger of death or injury to members of the public, following:—

(1) The administration of a poison for criminal purposes.

(2) The swallowing of a poison in mistake for an innocuous substance.

* The author of this notice is indebted to both the Secretary of the Royal College of Veterinary Surgeons and the Secretary of the Pharmaceutical Society for indicating those parts of the Act and of the Rules which affect veterinary surgeons.

(3) The inhalation, through ignorance or by accident, of vapours given off by a poison.

(4) The incorrect compounding of medicines containing poison.

(5) The accidental taking in too large a dose of a medicine containing a poison.

The Poisons List

In the construction of this List, unless the contrary intention appears:—

(1) A reference to a substance shall include a reference to that substance prepared either from natural sources or artificially;

(2) A reference to a substance shall include a reference to that substance when contained as such in any preparation, solution, admixture, or natural substance;

(3) Words in the singular shall include the plural, and words in the plural shall include the singular.

PART I.

Acetanilide; alkyl acetanilides
Acetic acid
Alkali fluorides other than those specified in Part II of this List
Alkaloids, the following; their salts, simple or complex:—
- Acetyldihydrocodeinone; its esters
- Aconite, alkaloids of
- Apomorphine
- Atropine
- Belladonna, alkaloids of
- Benzoylmorphine
- Benzylmorphine
- Brucine
- Calabar bean, alkaloids of
- Coca, alkaloids of
- Cocaine
- Codeine
- Colchicine
- Coniine
- Cotarnine
- Curarine
- Diacetylmorphine
- Dihydrocodeinone; its esters
- Dihydrohydroxycodeinone; it esters
- Dihydromorphine; its esters
- Dihydromorphinone; its esters
- Ecgonine; its esters
- Emetine
- Ephedra, alkaloids of
- Ergot, alkaloids of
- Ethylmorphine
- Gelsemium, alkaloids of
- Homatropine
- Hyoscine
- Hyoscyamine
- Jaborandi, alkaloids of
- Lobelia, alkaloids of
- Morphine
- Papaverine
- Pomegranate, alkaloids of
- Quebracho, alkaloids of, other than the alkaloids of red quebracho
- Sabadilla, alkaloids of
- Solanaceous alkaloids not otherwise included in this List
- Stavesacre, alkaloids of
- Strychnine
- Thebaine
- Veratrum, alkaloids of
- Yohimba, alkaloids of

Allylisopropylacetylurea
Amidopyrine
Amino-alcohols, esterified with benzoic acid, phenylacetic acid, phenylpropionic acid, cinnamic acid or the derivatives of these acids
Amylene hydrate
Amyl nitrite
Antimony, chlorides of; oxides of antimony; sulphides of antimony; antimonates; antimonites; organic compounds of antimony
Arsenical substances, the following except those specified in Part II of this List: arsenic, halides of; oxides of arsenic; arsenates; arsenites; organic compounds of arsenic
Barbituric acid; its salts; derivatives of barituric acid; their salts; compounds of barbituric acid, its salts, its derivatives, their salts, with any other substance
Barium, salts of, other than barium sulphate and the salts of barium specified in Part II of this List
Butyl chloral hydrate
Cannabis (the dried flowering or fruiting tops of *Cannabis sativa* Linn.); the resin of cannabis; extracts of cannabis; tinctures of cannabis; cannabin tannate
Cantharidin; cantharidates
Carbon tetrachloride
Chenopodium, oil of
Chloral formamide
Chloral hydrate
Chloroform
Creosote obtained from wood
Croton, oil of
Digitalis, glycosides of; other active principles of digitalis
Dinitrocresols; dinitronaphthols; dinitrophenols; dinitrothymols
Elaterin
Ergot (the sclerotia of any species of *Claviceps*); extracts of ergot; tinctures of ergot
Erythrityl tetranitrate
Ethyl bromide; ethyl chloride
Glyceryl trinitrate
Gold, salts of; gold, compound salts of
Guanidines, the following: polymethylene diguanidines, dipara-anisylphenetyl guanidine
Hydrochloric acid
Hydrocyanic acid; cyanides; double cyanides of mercury and zinc
Insulin
Lead acetates; compounds of lead with acids from fixed oils
Mannityl tetranitrate
Mercury, oxides of; nitrates of mercury; mercuric ammonium chlorides; potassio-mercuric iodides; mercuric oxycyanides; mercuric thiocyanate
Nitric acid
Nitrophenols
Nux Vomica
Opium
Orthocaine; its salts
Ouabain
Oxalic acid; metallic oxalates
Oxycinchoninic acid, derivatives of; their salts; their esters
Paraldehyde
Para-amino-benzoic acid, esters of; their salts
Phenetidylphenacetin
Phenols (any member of the series of phenols of which the first member is phenol and of which the molecular composition varies from member to member by one atom of carbon and two atoms of hydrogen) except

in substances, other than lysol or dilutions of lysol, containing less than 60 per cent., weight in weight, of phenols; compounds of phenol with a metal, except in substances containing less than the equivalent of 60 per cent., weight in weight, of phenols
Phenylcinchoninic acid; its salts; its esters
Phenylene diamines; toluene diamines; their salts
Phenylethylhydantoin; its salts; its acyl derivatives; their salts
Phosphorus, yellow
Picric acid
Picrotoxin
Pituitary gland, the active principles of
Potassium nitrite
Santonin; santoninic acid; its salts
Savin; oil of
Sodium nitrite
Strophanthus; glycosides of strophanthus
Sulphonal; alkyl sulphonals
Suprarenal gland, the active principles of; their salts
Thallium, salts of
Thyroid gland, the active principles of; their salts
Tribromethyl alcohol

PART II

Ammonia, solutions of
Arsenical substances, the following:—
Arsenic sulphides
Arsenious oxide
Calcium arsenates
Calcium arsenites
Copper acetoarsenites
Copper arsenates
Copper arsenites
Lead arsenates
Sodium arsenates
Sodium arsenites
Sodium thioarsenates
Barium, salts of, the following:—
Barium carbonate
Barium silicofluoride
Formaldehyde
Hydrofluoric acid; potassium fluoride; sodium fluoride; sodium silicofluoride
Mercuric chloride; mercuric iodide; organic compounds of mercury
Nicotine; its salts
Nitrobenzene
Phenols as defined in Part I of this List in substances, other than lysol or dilutions of lysol, containing less than 60 per cent., weight in weight, of phenols; compounds of phenol with a metal in substances containing less than the equivalent of 60 per cent., weight in weight, of phenols
Potassium hydroxide
Sodium hydroxide
Sulphuric acid

(NOTE.—Several poisons in this List are exempted by the Poisons Rules made by the Secretary of State under the Pharmacy and Poisons Act, 1933, from the application of the Act when present in certain specified substances or articles.)

By Section 18 of the Act, it shall not be lawful for a person to sell any poison included in Part I of the Poisons List, unless the sale is effected by, or under the supervision of a registered pharmacist, or for a person to sell any poison included in Part II unless he is an authorised seller of poisons or his name entered in the local authority's list. This Section of the Act also specifies the manner in which the container shall be labelled; the authority upon which the poison may be supplied, and the manner in which records shall be kept.

Section 19 specifically states that nothing in the foregoing Section shall apply to a medicine which is supplied by a registered veterinary surgeon for the purposes of animal treatment, provided that the following requirements are carried out:—

The medicine must be distinctly labelled with the name and address of the person by whom it is supplied or dispensed.

On the day on which the medicine is supplied or dispensed, or, if that is not reasonably practicable, on the next day following that day, there must be entered in a book which is regularly used for the purpose of this provision but which need not be used exclusively for that purpose, the following particulars:—

(*a*) The date on which the medicine was supplied.
(*b*) The ingredients of the medicine and the quantity thereof supplied.
(*c*) The name of the person to whom it was supplied.

By Section 20 nothing in the foregoing provisions shall extend to or interfere with the sale of an article to a registered veterinary surgeon for the purpose of his profession, except as is provided by rules.

Rule 7 (3). So much of Section 18 (2) as requires an entry in a book to be signed by the purchaser of the poison, shall not, as respects the sale of the poison to a person for the purpose of his profession, apply if the following requirements are satisfied: the seller must obtain before completion of the sale an order in writing signed by the purchaser stating his name and address, profession, the name and quantity of the article to be purchased, and the purpose for which the poison is required.

The Poisons Board has applied additional restrictions to the sale of certain poisons, chiefly certain of the narcotics and strychnine.

By Rule 11 (1) it shall not be lawful to sell any of the following poisons, except on and in accordance with a prescription given by a duly qualified medical practitioner, registered dentist or registered veterinary surgeon in the form provided by this rule:—

THIRD SCHEDULE

Barbituric acid; its salts; derivatives of barbituric acid; their salts; compounds of barbituric, its salts, its derivatives, their salts, with any other substance.

Dinitrocresols; dinitronaphthols, dinitrophenols, dinitrothymols.

Phenylcinchoninic acid; its salts; its esters.

Sulphonal; alkyl sulphonals.

By Rule 11 (3). For the purposes of this rule a prescription shall:—

(*a*) Be in the writing and signed by the person giving it with his usual signature and be dated by him.
(*b*) Specify the address of the person giving it.
(*c*) Specify, if the prescription is given by a veterinary surgeon, the name and

address of the person to whom it is to be delivered.

(*d*) Have written thereon, if given by a veterinary surgeon, the words "For animal treatment only."

(*e*) Indicate the total amount of the medicine to be supplied and the dose to be taken. [This presumably means "the dose to be given" in the case of a veterinary prescription.—J. G. W.]

By Rule 11 (4). The person dispensing the prescription shall comply with the following requirements:—

(*a*) The prescription shall not be dispensed more than once unless the prescriber has stated thereon that it may be dispensed more than once.

(*b*) If the prescription contains a direction that it may be dispensed a stated number of times or at stated intervals, it shall not be dispensed otherwise than in accordance with the direction.

Amongst the drugs in common use in veterinary practice, which come under these restrictions, are: nembutal, evipan sodium, luminal, veronal, pernocton, dial, and the various barbiturates included in the British Pharmacopœia, sulphonal.

By Rule 13 it shall not be lawful to supply strychnine except as an ingredient of a medicine, or to a person or institution concerned with scientific education, research or chemical analysis.

Discussing vermin killers, the report points out that white arsenic, certain salts of antimony and of barium, phosphorus salts of thallium, cyanides and strychnine, are all used for the destruction of rats and mice. Although the importance of effective vermin killers is recognised, it is considered undesirable that so large a range of dangerous substances should have wide distribution. The inclusion of barium carbonate, the poison most commonly used for the purpose, in Part II of the List, is considered sufficient to meet the public demands. It is pointed out that red squill, the safest and most effective vermin killer, is not included in the List.

The position regarding the sale of proprietary animal and poultry medicines will be of interest to veterinary practitioners. The Report states that, from the representations which have been made to the Board, it would appear that there is a considerable retail sale of animal medicines containing poison to farmers, cattle and horse breeders, poultry keepers and private owners of horses, dogs, cats and poultry by persons who are not lawfully "keeping open shop." Much of the trade is in the hands of manufacturing firms who deal direct with the animal owner or poultry keeper. As the system of control to be extended to listed sellers (Persons on the local authority's list entitled to sell poisons of Part II of the List) does not appear to be appropriate, it is recommended that provision should be made whereby animal medicine manufacturers may be permitted to continue the retail sale of their products. The position is dealt with in Rule 4. By it the restrictions—

shall not apply with respect to any of the poisons hereinafter specified if it consists of or is contained in a medicine for the treatment of animals (the word animal includes poultry) and is sold by a person carrying on a business which comprises the manufacture of medicines for the treatment of animals. . . .

This rule applies to the following poisons:—

Chlorides of antimony, sulphides of antimony, belladonna, the alkaloids of belladonna, cantharidin, carbon tetrachloride, oil of chenopodium, chloral hydrate, croton oil, mercuric iodide, mercuric oxide, santonin, and no other poison.

This list indicates the poisons which are likely to be incorporated in the animal medicines supplied to farmers and others by unqualified vendors.

The sale of arsenical sheep dips and other similar preparations is controlled by Rule 12 (2) and (3). No listed seller of Part II poisons shall sell:—

(*a*) Any poison included in the first column of the Fourth Schedule to these Rules unless the poison consists of or is contained in any of the substances mentioned against the description of the poison in the second column of that schedule, and the container of the substance is, in addition to any other direction of the Act or of these Rules with respect to labelling, labelled clearly with a notice of the special purpose for which the substance is intended, and a warning that it is only to be used for that purpose.

(*b*) Any arsenical poison, other than lead arsenate and calcium arsenate, any mercuric chloride, mercuric iodide or any compounds of mercury, unless the purchaser thereof is engaged in the trade or business of agriculture or horticulture and requires the poisons for the purpose of that trade or business.

Amongst the substances contained in the Fourth Schedule to the Rules are:—

First Column.		*Second Column*
Arsenious oxide	...	Sheep dips, sheep washes.
Arsenic sulphides	...	Sheep dips, sheep washes.
Sodium arsenates	...	Sheep dips, sheep washes.
Sodium arsenites	...	
Sodium thioarsenates	...	
Barium carbonate	...	Preparations for the destruction of rats and mice.
Nitrobenzene	...	Substances for the treatment of bee disease.

This schedule also contains the poisons used as agricultural and horticultural insecticides, fungicides, etc.

Veterinary Hospitals.—Special provisions are made in respect of medicines supplied by hos-

pitals and similar institutions, including veterinary hospitals. These are dealt with under Rules 24 and 26.

The Provisions of the Act and the Poisons Rules—

shall not apply with respect to any medicine for the treatment of animals supplied from a veterinary hospital which is under the superintendence of a registered veterinary surgeon, but the requirements contained in the following provisions of this rule shall be satisfied in relation thereto.

The medicine shall only be supplied by, or on and in accordance with a prescription of a registered veterinary surgeon for the purposes of animal treatment.

In a case where a substance included in the First Schedule is supplied, a record shall be kept on the premises in such a way that there can readily be traced at any time during a period of two years after the date on which the substance was supplied the following particulars:—

(*a*) The name and quantity of the poison supplied; and
(*b*) the date on which the poison was supplied; and
(*c*) the name and address of the person to whom the poison was supplied; and
(*d*) the name of the person who supplied the poison or who gave the prescription upon which it was supplied.

The container of the medicine shall be labelled:—

(*a*) With the name and address of the hospital, infirmary, dispensary or institution from which it was supplied;
(*b*) except in the case of a medicine made up ready for internal treatment, with the word "Poison";
(*c*) in the case of a poison supplied from a veterinary hospital, with the words "For animal treatment only".

Rule 26 deals with the requirements regarding the storage of poisons in institutions.

In any institution in which medicines are dispensed in a dispensing or pharmaceutical department in charge of a person appointed for the purpose, all poisons other than those issued for use within the institution shall be stored in that department.

In any institution to which the foregoing paragraph does not apply all poisons other than those issued for use within the institution shall be stored:—

(*a*) In charge of a person appointed for the purpose by the governing body or person in control of the institution;
(*b*) in the case of poisons which are included in the First Schedule either in a cupboard or drawer, or on a shelf, reserved solely for the storage of poisons.

Provided that, where a poison is stored on a shelf, the container of the poison shall be rendered distinguishable by touch from the containers of articles other than poisons stored on the same premises.

In every institution, every substance included in the First Schedule which is stored in the wards shall be stored in a cupboard reserved solely for the storage of poisons and poisonous substances.

All places in which poisons are required by this rule to be stored shall be inspected at regular intervals of time not exceeding three months by a pharmacist or by some other person appointed for the purpose by the governing body or person in control of the institution.

First Schedule

Substances falling within the Poisons List to which special restrictions apply

Alkaloids, the following; their salts, simple or complex:—
Acetyldihydrocodeinone;
Aconite, alkaloids of, except substances containing less than 0·02 per cent. of the alkaloids of aconite
Apomorphine except substances containing less than 0·2 per cent. of apomorphine
Atropine except substances containing less than 0·15 per cent. of atropine.
Belladonna, alkaloids of, except substances containing less than 0·15 per cent. of the alkaloids of belladonna calculated as hyoscyamine
Benzoylmorphine
Benzylmorphine
Brucine except substances containing less than 0·2 per cent. of brucine
Calabar bean, alkaloids of
Coca, alkaloids of, except substances containing less than 0·1 per cent. of the alkaloids of coca
Cocaine except substances containing less than 0·1 per cent. of cocaine
Codeine except substances containing less than 1 per cent. of codeine
Colchicine except substances containing less than 0·5 per cent. of colchicine
Coniine except substances containing less than 0·1 per cent. of coniine
Cotarnine except substances containing less than 0·2 per cent. of cotarnine
Curarine
Diacetylmorphine
Dihydrocodeinone
Dihydrohydroxycodeinone
Dihydromorphine
Dihydromorphinone
Ecgonine except substances containing less than 0·1 per cent. of ecgonine
Emetine except substances containing less than 1 per cent. of emetine
Ergot, alkaloids of
Ethylmorphine except substances containing less than 0·2 per cent. of ethylmorphine
Gelsemium, alkaloids of, except substances containing less than 0·1 per cent. of the alkaloids of gelsemium
Homatropine except substances containing less than 0·15 per cent. of homatropine.
Hyoscine except substances containing less than 0·15 per cent. of hyoscine
Hyoscyamine except substances containing less than 0·15 per cent. of hyoscyamine
Jaborandi, alkaloids of, except substances containing less than 0·5 per cent. of the alkaloids of jaborandi
Lobelia, alkaloids of
Morphine except substances containing less than 0·2 per cent. of morphine calculated as anhydrous morphine
Nicotine
Papaverine except substances containing less than 1 per cent. of papaverine
Pomegranate, alkaloids of, except substances

containing less than 0·5 per cent. of the alkaloids of pomegranate
Quebracho, alkaloids of
Sabadilla, alkaloids of, except substances containing less than 1 per cent of the alkaloids of sabadilla
Solanaceous alkaloids, not otherwise included in this Schedule, except substances containing less than 0·15 per cent. of solanaceous alkaloids calculated as hyoscyamine
Stavesacre, alkaloids of, except substances containing less than 0·2 per cent. of the alkaloids of stavesacre
Strychnine except substances containing less than 0·2 per cent. of strychnine
Thebaine except substances containing less than 1 per cent. of thebaine
Veratrum, alkaloids of, except substances containing less than 1 per cent. of the alkaloids of veratrum
Yohimba, alkaloids of
Allylisopropylacetylurea
Amino-alcohols, esterified with benzoic acid, phenylacetic acid, phenylpropionic acid, cinnamic acid or the derivatives of these acids, except in substances containing less than 10 per cent. of esterified amino-alcohols
Antimonial poisons except substances containing less than the equivalent of 1 per cent. of antimony trioxide
Arsenical poisons except substances containing less arsenical poison than the equivalent of 0·01 per cent. of arsenic trioxide
Barbituric acid; its salts; derivatives of barbituric acid; their salts; compounds of barbituric acid, its salts, its derivatives, their salts, with any other substance
Barium, salts of
Cannabis; the resin of cannabis; extracts of cannabis; tinctures of cannabis; cannabin tannate
Cantharidin except substances containing less than 0·01 per cent. of cantharidin
Cantharidates except substances containing less than the equivalent of 0·01 per cent. of cantharidin
Digitalis, glycosides of, except substances containing less than one unit of activity (as defined in the British Pharmacopœia) in two grammes of the substance
Dinitrocresols; dinitronaphthols; dinitrophenols; dinitrothymols
Ergot; extracts of ergot; tinctures of ergot
Guanidines, the following: polymethylene diguanidines, dipara-anisylphenetyl guanidine
Hydrocyanic acid except substances containing less than 0·1 per cent. of hydrocyanic acid (HCN); cyanides except substances containing less than the equivalent of 0·1 per cent., weight in weight, of hydrocyanic acid (HCN); double cyanides of mercury and zinc
Lead acetates; compounds of lead with acids from fixed oils
Mercuric chloride except substances containing less than 1 per cent. of mercuric chloride; nitrates of mercury except substances containing less than the equivalent of 3 per cent., weight in weight, of mercury (Hg); potassio-mercuric iodides except substances containing less than the equivalent of 1 per cent. of mercuric iodide; organic compounds of mercury except substances containing less than the equivalent of 0·2 per cent., weight in weight, of mercury (Hg)
Nitrophenols
Nux Vomica except substances containing less than 0·2 per cent. of strychnine
Opium except substances containing less than 0·2 per cent. of morphine calculated as anhydrous morphine
Ouabain
Oxycinchoninic acid, derivatives of; their salts; their esters
Phenetidylphenacetin
Phenylcinchoninic acid; its salts; its esters
Phenylethylhydantoin; its salts; its acyl derivatives; their salts
Picrotoxin
Savin, oil of
Strophanthus, glycosides of
Thallium, salts of
Tribromethyl alcohol

These rules (24 and 26) make it quite definite that it will not be lawful for a person to issue poisons for the treatment of animals from any hospital, dispensary or similar institution, unless it is under the superintendence of a registered veterinary surgeon.

The provisions regarding records, labelling, storage, etc., would appear to apply to hospitals run in connection with veterinary schools, and to hospitals, dispensaries and other institutions, run by animal protection societies, under the superintendence of veterinary surgeons.

The Poisons Rules will come into force in May, 1936.

It should be clearly understood that the Act and Rules under review in no way repeal or in any way influence the Dangerous Drugs Acts and Orders as they apply to veterinary surgeons. Certain anomalies in these have already been pointed out to the National Veterinary Medical Association by the reviewer.

Summary

The Pharmacy and Poisons Act of 1933, together with the Draft Poisons Rules prepared by the Poisons Board, places additional restrictions on the use of poisons by veterinary surgeons. These comprise:—

(1) Poisons may only be supplied to veterinary surgeons by wholesalers and pharmacists on receipt of a signed order.

(2) Records must be kept of all poisons supplied by veterinary surgeons.

(3) A veterinary prescription ordering a pharmacist to supply those poisons included in the Third Schedule, must be in the form provided.

(4) Persons or bodies in charge of veterinary hospitals, dispensaries and similar institutions, must conform to provisions regarding records of poisons supplied, labelling of medicines containing poisons, and the storage of poisons.

J. G. Wright.

A GUIDE TO THE POISONS RULES

We are informed that it is the intention of the Council of the Pharmaceutical Society to

N.V.M.A. Divisional Report

VETERINARY MEDICAL ASSOCIATION OF IRELAND*

MEETINGS AT MALLOW AND DUBLIN

Provincial General Meeting

A General Meeting of the Veterinary Medical Association of Ireland was held in the Central Hotel, Mallow, on June 29th, 1935, at 7.30 p.m., when the following members were present: Messrs. R. R. Pierse, Sean O'Donovan, P. J. Nolan, F. Crowne, J. J. Brennan, P. Harnett, J. Pomeroy, W. J. Henigan, J. A. Morris, D. McCarthy, J. T. Brady, R. P. Byrne, T. O'Leary, S. R. J. Cussen, J. J. Dundon, E. A. Phipps, Wm. B. Prendergast, W. Reidy, D. M. Barry, C. P. Hynes, M. McCartin, H. O'Leary, Wm. O'Callaghan, Wm. Nyhan and Professor J. J. O'Connor (Hon. Secretary).

The minutes of the previous meeting, having been circulated, were taken as read and were signed by Mr. O'Leary, who accepted the chair in the temporary absence of Mr. O'Donovan.

Apologies for absence were received from Messrs. Donnelly, Mulcahy, Condon, R. Power, P. F. Dolan and Professor Craig.

Paper.—Mr. R. R. Pierse (Listowel) read a paper which was entitled "A Diagnosis of Tuberculosis under the Tuberculosis Order having reference to the Forms of Tuberculosis dealt with under the Order." The paper was a masterly production and was listened to with great interest. On its conclusion, Mr. Pierse received great applause. Several speakers expressed their appreciation and praise of the paper. [Mr. Pierse's contribution is reproduced, together with a report of the discussion which followed its presentation, at the commencement of this issue of *The Veterinary Record.*—*Editor.*]

Professor J. J. O'Connor, who described the paper as excellent both from a practical and theoretical point of view, stated that he owed Mr. Pierse an apology for his name not appearing on the Agenda Notice as the author of the paper. By an oversight it was omitted from the draft sent to the printers.

X-Ray Demonstration.—Messrs. Armstrong and Taylor, of the Victoria X-Ray Corporation, gave a very interesting demonstration of radiography and described its uses and its limitations. Several radiographs of veterinary patients were exhibited on the screen.

The President, on his own behalf and that of the members present, thanked those gentlemen for the pains they had taken in providing such interesting matter for the benefit of the meeting.

Mr. Armstrong suitably replied.

Mr. H. O'Leary described his experience of the use of the X-ray apparatus shown by Mr. Armstrong and enumerated a number of cases in which diagnosis which was otherwise obscure was confirmed by the use of X-ray. He said that he had just procured one for himself and stated the terms on which practitioners could avail themselves of it when necessary.

The meeting was a great social success and it proved a very pleasant reunion for many veterinary surgeons who had not met for months or, in some instances, years.

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The Dublin Meeting

A General Meeting of the Veterinary Medical Association of Ireland was held in the Veterinary College, Dublin, on Tuesday, August 6th, 1935, at 7.30 p.m., when the following members were present: Messrs. E. A. Phipps, W. Walsh, P. M. McManus, J. S. McCann, A. J. MacDonald, P. J. Gaffney, James Dodd, M. J. McClancy, F. S. Ringwood, C. M. Griffin, A. F. O'Dea, Sean O'Donovan (President), Miss Hilda Bisset, Professor W. Kearney and Professor J. J. O'Connor (Hon. Secretary).

Messrs. T. Taylor, R. W. Armstrong and R. J. Roe (Cyprus) were also present as visitors.

The President announced that the minutes of the last General Meeting held at Mallow were not yet ready, as some of the speakers at that meeting had not yet sent in copies of their remarks.

Correspondence.—(1) Apologies for absence were received from Messrs. J. V. Carroll, P. F. Dolan, W. Nyhan and T. R. Mulcahy.

(2) Letter from Mr. F. Knight, General Secretary of the N.V.M.A.: (*a*) Saying that the Organising Committee of the N.V.M.A. had suggested that Secretaries of Divisions should be asked to use their influence in persuading members of their associations who are not members of the N.V.M.A. to join it.

[The President, in accordance with the request, explained to the meeting the advantage of joining the "National" and appealed to those

* Received for publication August 30th, 1935.

publish an official book on the new Poisons List and Rules, and that it is anticipated that the book will be available for issue by January 1st, 1936—four months in advance of the date when the Rules will be come operative. In addition to an explanation of the Poisons List and Rules, the book will contain as complete a list as possible of substances which are affected by them; it will also deal with the regulations of the Statutory Committee and of the Dangerous Drugs Acts. Copies will be obtainable from the Pharmaceutical Press, 23, Bloomsbury Square, London, W.C.1, price 5s. 6d. post free.

members of the Association who have not already done so to join at once.]

(*b*) Enclosing for the information of the members a copy of the Report of the Special Committee on Fur-Bearing Animals, etc. [The Hon. Secretary read the Report, the contents of which afforded much information showing the importance and rapid growth of the industry in connection with these animals, and included suggestions for adoption by the R.C.V.S. whereby future graduates of the College would become acquainted with the habits of these animals and with their diseases, so as to be in a position to give expert advice to those engaged in their breeding.]

(*c*) Enclosing a copy of the Rules governing the award of the Dalrymple-Champneys Prize. [The Hon. Secretary read the Rules.]

(*d*) Forwarding a copy of the recommendation of the Organising Committee of the N.V.M.A. adopted by a meeting of the Council of the Association held on July 2nd, 1935, as follows: "That for the purpose of appointing representatives to the Council of the N.V.M.A. only those members of a Division who are also members of the Association should be taken into account in determining the number of representatives allowed."

Resignation of Professor J. F. Craig from Veterinary College of Ireland

A resolution was passed unanimously regretting the departure of Professor Craig from the Veterinary College of Ireland to take up duty as Professor of the William Prescott Chair for the Care of Animals in Liverpool University and wishing him every success in his new sphere of activities.

The President said he believed he was right in stating that there was a general feeling in the profession to give to Professor Craig, on his departure from Ireland to take up a new position on the other side, some token of the esteem in which he was held during his stay in this country and he thought it would be well to do this through the Veterinary Medical Association.

After some discussion it was decided to leave the matter to the Council to make the necessary arrangements for the purpose.

Impromptu Discussion on Clinical Cases.—The President announced that owing to illness Mr. L. M. Magee was not able to provide the paper arranged for the meeting. He was glad to say that Mr. Magee was quite recovered now. In the circumstances it was decided to have an impromptu discussion on clinical cases.

This proved quite a success, as many matters of practical importance were discussed. Professor O'Connor enumerated a number of surgical cases of unusual interest.

Report of Council.—The following report of Council was read for the meeting and was approved and adopted.

A meeting of the Council was held on Friday, June 12th, 1935.

The meeting was specially convened to consider the terms of appointment of Veterinary Meat Examiners employed under the Agricultural Produce (Fresh Meat) Act, 1930, and to make arrangements for a deputation to wait on the Minister for Agriculture with a view to having these officers appointed on a permanent pensionable basis.

The meeting decided to ask the Minister for Agriculture to receive a deputation consisting of the President (Mr. Sean O'Donovan), the Hon. Secretary (Professor J. J. O'Connor), and Mr. J. J. Dundon of Limerick. A formal application to the Minister was made, but a reply was received from the Secretary of the Department to the effect that the Minister could not receive a deputation from an outside body such as the Veterinary Medical Association of Ireland. The Minister, however, intimated that he would be prepared to grant an interview to representatives of the Veterinary Meat Examiners employed under the Act.

Mr. Harnett was immediately advised of this fact and advised the course to pursue to obtain the interview with the Minister.

J. J. O'Connor, *Hon. Secretary.*

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

Sept. 28th.—Meeting of the North of England Division, N.V.M.A., at Newcastle-on-Tyne, 3 p.m.

Sept. 30th.—N.V.M.A. Committee Meetings, 2, Verulam Buildings, W.C.1.

Oct. 1st.—N.V.M.A. Committee Meetings, 2, Verulam Buildings, W.C.1, and Council Meeting, Connaught Rooms, Great Queen Street, W.C.2.

Oct. 2nd.—R.C.V.S. Committee Meetings.

Oct. 3rd.—R.C.V.S. Committee Meetings.

Oct. 3rd.—Annual General Meeting of the Central Division, N.V.M.A., Conway Hall, W.C.1, at 6.30 p.m.

Oct. 4th.—R.C.V.S. Committee and Council Meetings.

Oct. 7th.—Meeting of the Editorial Committee, N.V.M.A., at 2, Verulam Buildings, Gray's Inn, W.C.1, at 4 p.m.

Oct. 8th.—Meeting of the Derbyshire Division, N.V.M.A., at Sutton Bonington, 2.30 p.m.

VETERINARY COLLEGE OF IRELAND

Professor O'Connor Succeeds Principal Craig

It is with great pleasure that we inform our readers that Professor J. J. O'Connor, Professor of Surgery in the Veterinary College of Ireland, Dublin, has been appointed Principal of the College on the departure of Professor J. F. Craig to fill the William Prescott Chair of the Care of Animals—Causation and Prevention of Disease, University of Liverpool. This information having reached us shortly before publication, we are unable, in this issue, to do more than extend to Professor O'Connor, on behalf of his colleagues in the profession, our warmest congratulations on his appointment as head of the great institution which he has served so ably and so faithfully over a large number of years in the capacity of Professor of Surgery.

Professor O'Connor, who is a native of Dublin, graduated at Edinburgh in 1899, and he has been attached to the Veterinary College of Ireland since its inception in 1902; he has been President of the Veterinary Council of Ireland since its commencement.

The new Principal, who takes up his duties at once, will also be well known to members of the profession as the Hon. Secretary of the Veterinary Medical Association of Ireland and for his splendid work as Local Secretary when the N.V.M.A. held its Annual Meeting in Dublin in 1926.

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PERSONAL

Appointment. — Herefordshire Diseases of Animals Committee has appointed Mr. George Barrie Fairweather, M.R.C.V.S., of Milnathort, Kinross-shire, as Assistant County Veterinary Officer, in succession to Mr. J. A. McKinnon, who recently secured a post under West Sussex County Council.

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FOOT-AND-MOUTH DISEASE: MINISTRY'S WARNING

The following notice was issued by the Ministry of Agriculture on Wednesday last:—

"The Ministry of Agriculture desires to draw the special attention of stockowners to the fact that four outbreaks of foot-and-mouth disease have been confirmed yesterday and to-day on widely separated premises, two in Glamorgan, one in Monmouthshire, and the fourth in Warwickshire.

"In only one of these cases was the existence of disease reported by the owner of the animals. It appears from present information that the diseased animals concerned in all four cases contracted infection at the market held at Newport (Monmouth) on September 16th but it has been ascertained that animals from the infected premises have recently been exposed in markets at Usk (Monmouth) and Stratford-on-Avon.

"There appear, therefore, to be grounds for apprehension that infection may be more widely disseminated than is at present known, and it is imperative for these reasons that every stockowner, more especially in South Wales and the Midlands, should keep a careful watch on the condition of health of his livestock and report without delay to the local police any suspicious symptoms which he may notice affecting the mouths and feet of his animals."

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ARMY VETERINARY SERVICE

London Gazette—War Office—Regular Army

Sept. 30th.—The following Lieuts. to be Capts. (Sept 12th): J. R. Stewart, P. A. Reeves.

Movements of Officers

Major J. Southall was posted from Hounslow to Woolwich on September 16th, for the purpose of assuming duty as Officer Commanding R.A.V.C. Depôt and Station Veterinary Hospital, *vice* Major C. Davenport, O.B.E., F.R.C.V.S., who proceeded to Shorncliffe for duty on September 20th.

Lieut.-Colonel R. A. Gooderidge, O.B.E., sailed for India on September 18th, for a tour of duty abroad.

Lieutenant R. H. Duff was posted from Aldershot to Hounslow on September 24th.

Majors F. B. Hayes, O.B.E., and V. A. Bartrum, O.B.E., are at present in this country on leave *ex* India.

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R.C.V.S. OBITUARY

Baldrey, Frank Shelson Headon, C.M.G., F.R.C.V.S., D.V.H., Lieut.-Colonel late Indian Civil Veterinary Department; Shelson, Roath, near Canterbury, Kent. Graduated London, December 17th, 1890; died June 5th, 1935.

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DEFENCE OF HORSE TRANSPORT

The National Horse Association, in pursuance of its effort—in conjunction with other societies interested in horse transport—to enlist public opinion against the proposals of the Minister of Transport to ban horse-drawn vehicles from the streets in certain city areas, has set up a committee, consisting of Mr. James Forshaw, Sir Walter Gilbey, Mr. Nigel C. Colman, Mr. F. J. Rawle, and Mr. J. W. McIntosh, to discuss action with other similarly-minded interests should the need arise.

The Association are about to publish a pamphlet defending horse transport against its critics.

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LONG-LIVED HORSES

Discoursing on the interesting subject of longevity in horses, Mr. R. A. Brown, Secretary of the National Horse Association, who has been compiling a list of horses which lived to an unusually old age, gave pride of place to Old Billy, an equine ancient whose unparalleled achievement in attaining the age of 62 was recorded in detail in our issue of June 13th, 1931.

"Although it was more than 100 years since Old Billy lived, his age was testified beyond doubt, and his teeth also gave indications of extreme old age," said Mr. Brown, "Old Billy first worked at the plough at Wild Grove Farm, Latchford, Warrington, before being bought by the Mersey and Irwell Navigation Company of Manchester, who employed him up to 1819. The grandfather of Sir Lionel Earle gave Old Billy a home on his Cheshire estate, and there the horse spent his last days. His skull is believed to be at the University of Manchester.

"Among other old horses, Paramatta, an Australian horse, died in 1874, aged 53. A Welsh roan pony called Tommy, owned first by a Northampton butcher and then by a fruit hawker, made regular rounds of the villages until he died at 52. A Russian pony which worked through

the Crimean War as one of Sir Garnet Wolseley's pack ponies was eventually shot in Devonshire, aged 49. Robin (47), and Joan (37), which died in 1929, belonged to the Rev. Gore Skipworth, of Oakfield, Mortimer, Berks.

"Mick, a fine white horse, belonged to Mr. Bramley, of Barrow-on-Humber. He was foaled in 1888, and was still alive not long ago. At six years old Mick was bought by a Hull cab proprietor, who called him Snowflake, and he drew a cab for 25 years. In 1914 Mick took part in the Royal procession when the King opened the King George Dock, Hull.

"Dot, a Scotland pony belonging to Miss M. Gibbs, who lives near Belvoir, is still alive at the age of 48."

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LICENSING OF BULLS

The Ministry of Agriculture state that information is now available with regard to the results of the first year's working of the Improvement of Livestock (Licensing of Bulls) Act, 1931, which came into force in England and Wales on August 1st, 1934. Every bull which had not on that date reached the age of ten months was required to be licensed by the time it subsequently reached that age. Bulls which after inspection by the Ministry's Livestock Officers are rejected as unsuitable for licence are ordered to be castrated or slaughtered, but the owner may appeal against the Ministry's decision if he so desires, in which event the bull is examined by an independent referee selected from a panel set up for that purpose on the nomination of the National Farmers' Union and the Breed Societies interested. The decision of the referee is final.

The total number of applications received in England and Wales up to July 31st, 1935, when the Act had been in operation for a full year, was 28,269. Licences had been issued by that date for 22,607 bulls, and 2,378 had been rejected as unsuitable for licensing. Particulars of the numbers licensed and rejected of each breed are given in the following table:—

	England.		Wales and Monmouth.		England and Wales.	
	Licensed.	Rejected.	Licensed.	Rejected.	Licensed.	Rejected.
Aberdeen Angus	599	38	36	—	635	38
Ayrshire	183	18	9	—	192	18
Blue Albion	32	6	5	—	37	6
British Friesian	1,138	89	72	6	1,210	95
Devon	720	38	—	—	720	38
Dexter	8	—	1	—	9	—
Dun and Belted Galloway	13	1	—	—	13	1
Galloway	258	27	—	—	258	27
Gloucestershire	3	—	—	—	3	—
Guernsey	961	34	8	1	969	35
Hereford	1,139	80	667	78	1,806	158
Highland	2	—	—	—	2	—
Jersey	327	13	1	1	328	14
Kerry	12	—	1	—	13	—
Lincs. Red Shorthorn	1,091	87	18	2	1,109	89
Longhorn	2	1	—	—	2	1
Park	18	—	—	—	18	—
Red Poll	413	44	4	—	417	44
Shorthorn	11,999	1,199	1,909	220	13,908	1,419
South Devon	270	6	—	—	270	6
Sussex	161	7	—	—	161	7
Welsh Black	5	—	291	18	296	18
Cross-bred	196	320	35	44	231	364
	19,550	2,008	3,057	370	22,607	2,378

The Ministry found during the course of the year that a certain number of farmers neglected to make application for licences for their bulls and that the excuse usually made was ignorance of the requirements of the Act. In order to bring home to every farmer the fact that bulls must be licensed, a leaflet drawing attention to the Act was circulated with the 1935 Agricultural Returns schedule, and in this way every occupier of an agricultural holding exceeding one acre in extent received a direct notification of the licensing procedure now in force.

Farmers are reminded that the penalty for keeping an unlicensed bull is a fine not exceeding £5 in the case of a first offence, or £20 in the case of a second or subsequent offence, and that now that the provisions of the Act are well-known, prosecution may follow the discovery of a bull that should be licensed without a previous warning having been given to the farmer. The application for a licence should be forwarded to the Ministry not later than 28 days before the bull attains the age of ten months. Application should not however be made before the bull attains the age of eight months.

Arrangements are in force for bull licences issued in England and Wales and in Scotland to be transferable without further inspection of the animals when they are removed from one country to the other, but this does not apply to bulls imported from Ireland, which although they may have been previously licensed in that country require a fresh licence after importation.

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SHOULD SCIENTIFIC PUBLICATION BE CONTROLLED?

Following upon the long-delayed publication of Cornelius Betten's great work on the Caddis flies by the New York State Museum at Albany, the above query is raised by Professor T. D. A. Cockerell in a letter to *Nature*, August 10th. A reviewer of the work has ascribed the delay to the fact that, although the revised manuscript was ready in 1915, the funds planned for its

publication were used for projects of more immediate use to the Museum. In the meantime, works by various casual students of the order have been published, one in particular—a much abbreviated summary—being printed privately on a duplicating machine after the present volume was in the press.

All zoologists and botanists, says the correspondent, are aware of the trouble caused by irregular publications and of the controversies which have arisen as to what constitutes a publication, while the rule requiring that a work must be placed on sale is ambiguous, and not always observed. Thus the splendid memoirs of the United States National Academy are not for sale until they come on the second-hand market. With the newer methods of duplication, as indicated above, anyone can get out a small publication and offer it for sale, though it may not be obtainable through the usual channels, and may be almost unknown. It would be a great evil if publication were controlled by any particular group, but some regulation is evidently needed, one suggestion being that a type specimen of any work should be deposited in a museum where it could be examined.

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WARBLED CATTLE

At a recent meeting of the Agricultural Committee of the County Councils Association the Committee considered the following letter received from the Ministry of Agriculture and Fisheries in reply to the resolution passed by them at their last meeting upon the subject of co-operation with the Irish Free State Authorities for the eradication of the warble pest:—

May 29th, 1935.

" Sir,

I am directed to refer to your letters of the 3rd and 4th instant on the subject of Warble Fly and to say that, before considering a further approach to the Governments of the Irish Free State and Northern Ireland on the question of a general regulation requiring the periodical dressing of cattle, the Ministry considers it necessary to obtain a clearer expression of the views of the National Farmers' Union in England and Wales on the application of such measures in relation to imported cattle. The Ministry is accordingly communicating with the Union on this point.

I am also to inform you that the Ministry proposes, in due course, to address a letter to all County Local Authorities on the question of the administration of a general compulsory Order if one were made.

(Signed) H. H. Miller.

The Secretary,

County Councils Association."

It was thereupon resolved: " That having regard to the previous negotiations between the Association and the National Farmers' Union on this subject and to information since received, the Committee feel justified in expressing their confidence that, provided the co-operation of the Irish Authorities is forthcoming as now seems likely to be the case, the National Farmers' Union will agree to the imposition of compulsory measures for the eradication of the warble pest. The Committee therefore *recommend* that the Ministry of Agriculture and Fisheries be urged to approach the Irish Government Authorities without delay, and that the Union be asked to support this proposal."

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DISEASED CATTLE AT SALISBURY

" Salisbury has not only one of the oldest, but also one of the best markets in the south of England, and the local authority are determined that, so far as possible, they will prevent diseased animals coming into the market," said the Town Clerk (Mr. Arthur Smart) at Salisbury City Police Court recently. These observations were induced by a case in which Alexander John Coombes, Brooks Farm, East Stour, near Gillingham, was summoned for failing to report that three cows he had in his possession appeared to be suffering from tuberculous emaciation on July 30th.

Mr. W. Farley Rutter defended and Coombes, who had offered the animals for sale at the market, pleaded not guilty.

The bench found the cases proved and fined the defendant a total of £30.

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RHODESIAN CATTLE AND S. AFRICAN SAFEGUARDS

Recently an official announcement was made that the Union Government would allow cattle from Rhodesia to go to the Johannesburg market for slaughter, but the restrictions attached to the offer are regarded in Rhodesia as practically prohibitive, says the Bulawayo message to *The Morning Post*.

Cattle for Johannesburg must be quarantined for 14 days on the railway line or nearby (but not on the owners' farms, even though the latter would be under the supervision of Rhodesian veterinary surgeons). " Farmers here are saying that surely the local veterinary department is as able to say what cattle are safe to go forward as Union Veterinary Department officials, especially as they certify what cattle are safe to go through Union territory in sealed trucks for export overseas.

" By insisting on 14 days' quarantine on railway lines where there is practically no grazing now, and water a most difficult problem, the Union Government, it is claimed, is really annulling this offer to take Rhodesian cattle."

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ANTI-RABIC TREATMENT AT HOME

Under the above heading the *Lancet* in a recent issue makes reference to the attack made by Drs. P. Remlinger and J. Bailly on the tradition of some 50 years' standing that everyone bitten by a rabid animal should be sent to a Pasteur Institute, however far away it may be, there to be treated for some 15 to 25 days, according to a mystic ritual.

" During the past ten years," proceeds the *Lancet*, " there have been signs of revolt against this centralisation of orthodoxy to which Italy, Russia, Portugal, India and Japan have all conformed. Since 1935, Professor Puntoni of the Anti-rabic Institute of Rome has been distributing a carbolised vaccine to a great number of anti-rabic dispensaries. His views as to the harmlessness and potency of the various forms of rabies treated by carbolic acid have been confirmed in many quarters, and the statistics of decentralised vaccination with a dead vaccine are said to show that it is in no respect inferior to treatment with vaccines prepared by attenuation of the virus at a central Pasteur Institute.

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.
All correspondence must bear the name and address of the contributor for publication.
The Editor does not hold himself responsible for the opinions of his correspondents.

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PARODONTAL DISEASE IN ANIMALS

To the Editor of The Veterinary Record

Sir,—Sir Frank Colyer's article, in your issue of July 27th, on parodontal disease was of particular interest to me as he mentioned its prevalence in Stellenbosch District. Since residing here for the last few years I also have been impressed by its relative frequency and therefore perhaps these few remarks may be of confirmatory interest to some readers. It is a local belief that human residents here are more prone than in other parts of South Africa to dental trouble, which belief perhaps is borne out by the fact that four dental surgeons are kept busy in the village. In the local lower animals caries of itself is not of unusual frequency, but the trouble is parodontal—to which equines here are peculiarly prone.

On making a manual examination of aged horses or mules troubled with difficulty in masticating one or more of the following conditions are usually encountered:—

(*a*) One or more molars entirely missing.

(*b*) Some molars almost disappeared, leaving portions or fragments in the gum, which latter may be healthy.

(*c*) Unequal wearing causing a molar to be worn away, with an elongated opposing molar.

(*d*) Molars loose in the socket surrounded by evil-smelling food pieces, particularly chaffed straw. Such molars I have occasionally removed with the fingers quite easily.

(*e*) Missing or loose incisors which latter are greatly elongated; in fact, an aged horse locally bred and brought up with its full complement of teeth seems to be the exception. One remarkable case was a mule which on account of lameness had been turned out to run in a grass paddock and remained in good condition. An examination of its mouth for age showed that it possessed only one solitary loose incisor which I extracted. The owner was unaware of any dental deficiency as, to his observance, it grazed and ate like other mules. I knew another ancient mule from which I extracted loose teeth occasionally and it finished its days with half of its complement of incisors and molars.

Rightly or wrongly, I have attributed the equine dental trouble here to the feed characteristics. Many owners feed extensively on a dry chaff made from chopped oat or wheat straw. This seems to pack in between the teeth, and between the teeth and gums, both molars and incisors, the sharp ends penetrating the parodontal tissue. In my experience the first lower molar is as apt to be missing, or affected in some way, as is also the third.

So far my attention has not been called to parodontal disease in cattle. The reason may be because of their shorter life expectation and also because they do not usually get this dry chaffed straw.

I have encountered aged cats with many or most of the molars and even canines and incisors missing. Dogs seem to lose their incisors first.

Yours faithfully,

F. J. Dunning, F.R.C.V.S.

Stellenbosch,
South Africa.
August 27th, 1935.

The Editor acknowledges, with thanks, the receipt of the following:—

Communications from Dr. F. G. Cawston (Durban), and Professor J. G. Wright and Miss M. Oyler (Royal Veterinary College, London).

Reports of meetings of the Dumfries and Galloway, North Wales and the West of Scotland Divisions, N.V.M.A., from their respective Hon. Secretaries.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th Sept., 1935	7	8	—	—	—	1	35	63	36
Corresponding period in									
1934	10	11	2	130	4	9	26	61	40
1933	10	12	3	74	3	3	35	33	23
1932	2	2	3	300	2	2	3	43	18
Total 1st January to 15th Sept., 1935	250	293	34	10,208	84	170	262	1,377	814
Corresponding period in									
1934	274	312	7	584	102	169	435	1,140	715
1933	202	230	65	6,123	112	188	275	1,049	642
1932	253	311	9	862	101	161	167	1,250	616

Note.—The figures for the current year are approximate only. §. Excluding outbreaks in Army Horses.